



Smart building management

Executive summary

In today's commercial real estate landscape, energy management is a top priority for asset, property, and facilities managers. With increased urbanization and a growing population, energy consumption from buildings is rising, making optimization go beyond cost savings; it has become central to sustainability and resource efficiency. Fueled by increasing energy prices, carbon-reduction goals, and tighter regulations, energy optimization is now critical for future-proofing commercial buildings. The value of these solutions is twofold: they save money and increase the property's value.

"iBOS energy is a cutting-edge energy optimization software that integrates seamlessly with existing or new HVAC systems, helping property owners significantly reduce energy consumption while maintaining optimal indoor comfort."

iBOS energy has been on the market since 2008 and is deployed in over 1,000 buildings globally. By combining self-learning algorithms, predictive weather analysis, and thermal mass modelling, iBOS energy delivers consistent energy savings; in many cases, up to 40% have been recognized. iBOS energy optimizes not only heating but also cooling and ventilation. What further sets iBOS energy apart is its advanced edge computing, including thermal mass utilization, weather-based adaptations, and zone-level control, features that many legacy systems lack or underutilize.

Background:

Buildings are among the largest consumers of energy, accounting for nearly 40% of global CO₂ emissions. Approximately 30% of energy used in commercial buildings is wasted, and substantial savings can be achieved by adopting proper processes, best practices, and optimizing technology. Traditional HVAC systems often operate inefficiently, overheating and cooling simultaneously, responding to short-term fluctuations rather than long-term energy needs, and lacking coordination between subsystems. This results in overusage of the systems and unnecessary energy consumption.

Market Landscape: Energy Optimization Systems

Trends in smart buildings focus on enhancing efficiency, security, and sustainability by integrating advanced technologies and innovative solutions. It is important to note that several factors impact energy use in a building, including climate, location, the building's age and design, and installed equipment and technology.

Some of the trends in smart buildings are:

Internet of Things (IoT) and sensors: The use of IoT devices and sensors has significantly increased in smart buildings. These sensors can monitor various aspects of buildings, including temperature, air quality, lighting, and space utilization. Data collected from these sensors is then used to optimize the building's performance and comfort.

Energy and resource efficiency: Sustainability is a key driver in smart buildings. Buildings are equipped with advanced energy management and monitoring systems to reduce energy consumption and, consequently, carbon emissions. These systems can regulate lighting, heating/cooling, and ventilation based on real-time data and user behavior.

Artificial Intelligence (AI) and machine learning: AI and machine learning are used to predict and optimize building performance. By analyzing data from sensors and other sources, AI algorithms can optimize energy consumption, maintenance planning, and indoor comfort.

used to monitor and simulate the building's performance in real time, allowing the identification and resolution of issues before they occur and optimizing building operations.

Security and accessibility: Smart buildings integrate advanced security solutions, including surveillance systems, biometric authentication, and access control.

Health and well-being: Smart buildings focus on improving the health and well-being of occupants and users. This includes better indoor air quality, lighting adjusted to promote well-being, and systems that encourage movement and activity.

Cloud & edge computing: Many solutions are now hybrid, with real-time edge computing (for reliability) plus cloud analytics (for portfolio-wide insights). These trends in smart buildings demonstrate an apparent effort to create more sustainable, secure, and efficient buildings that can meet the growing demands of users and society. It is important to note that the development of smart buildings continues to evolve, and new technologies and solutions are likely to emerge in the future.

Market Growth & Demand

The market for energy optimization systems, particularly those focused on commercial buildings and HVAC systems, is experiencing rapid growth. The demand for green properties will continue to rise. This can be attributed to several significant factors, including increased awareness of sustainability, economic incentives for green properties, and growing legislation promoting environmentally friendly construction and management practices. This trend is evident in the market analysis and is confirmed by players in the real estate industry, including investors and competing companies, which are fueled by it.

-**Regulatory pressure** to reduce carbon emissions (e.g., EU Green Deal, US Inflation Reduction Act, Canada's Net Zero targets)

-**Rising energy costs** are pushing companies to find efficiency gains.

-**ESG (Environmental, Social, Governance)** requirements are driving investment in intelligent energy management.

-**Corporate net-zero goals** are creating urgency for scalable, data-



driven energy solutions.

Market growth

Global investments in clean energy and efficiency technologies in buildings grew by 8% in 2022 to an estimated 22.4 billion dollars, according to the International Energy Agency. The surge is driven by both regulatory mandates and market demand for more sustainable buildings. And the market is expected to continue to grow over the following years.

Challenges

Even with significant market potential driven by emerging new technology, there are also challenges related to the complexity of older buildings and retrofit environments, and a lack of skilled professionals to manage advanced systems.

There are also integration challenges across fragmented hardware/software ecosystems, with no industry-wide standard applied to setups and system configurations.

These new emerging digital services are sold with a “software as a service” business model, with monthly or annual fees. The transition to subscription-based business models is new to a market accustomed to one-off products and upfront investments. However, the benefit is that products continuously evolve with new features and updates throughout their lifespans, ensuring that the building stays up to date with the latest security patches and services.

The iBOS energy Solution

iBOS energy® optimizes your HVAC systems 24/7 through intelligent control and adaptive energy management, and provides comprehensive, actionable information for all your buildings. Harnessing the power of predictive weather, indoor temperature, and the thermal mass of the building, the intelligence in iBOS energy® updates existing HVAC systems with new parameters and extends to continuously optimize operations and achieve energy savings while optimizing the indoor climate. As iBOS energy® minimizes energy consumption, it helps you meet the EU's climate targets on greenhouse gas emissions.



BOS energy offers an innovative AI-driven approach to HVAC optimization. It transforms building control by:

- Dividing buildings into independent, intelligent zones based on usage and thermal inertia.
- Using the building's thermal mass to store and release energy
- Adjusting HVAC settings continuously based on learned behavior
- Maximizing the lifespan of the building's HVAC systems by managing them in a controlled and optimized way

- Using predictive weather forecasts and real-time sensor data

Unlike many cloud-based systems, iBOS energy operates as an edge system and does **not require a constant internet connection**. This ensures reliability, even in challenging environments. The system is upgraded around 5 to 8 times a year with new features and security patches.

Key Features

- **Self-learning Algorithms:** Adapts to each building's unique characteristics and usage patterns.
- **Zone-based Control:** Allows precise temperature and air quality control in different parts of the building.
- **Thermal Mass Utilization:** Reduces reliance on external energy by using stored heat/cool in building materials.
- **System Coordination:** Prevents heating and cooling systems from working against each other.
- **Predictive Energy Management:** Plans using 5-day weather forecasts and historical performance data.
- Self-learning algorithms are systems that can autonomously learn and improve performance without human intervention or explicit programming. Every property is unique, and its conditions are constantly changing. Keeping track of all these conditions and how they affect the building's climate is impossible for a human.
- iBOS energy uses and calculates new set points using vast amounts of historical data from HVAC systems, sensors, and energy meters, along with forecasts and prior outcomes, to determine how the property responds to current and forecasted conditions.



Results

Real-world installations have demonstrated energy savings between 15–40%, with a measurable reduction in greenhouse gas emissions.

By avoiding overuse of HVAC systems and coordinating subsystems more effectively, iBOS energy ensures:

- Lower energy bills
- Extended HVAC equipment lifespan
- Enhanced tenant comfort
- Increased property value
- Reduction of power-peaks
- Compliance with climate goals (e.g., the EU's Green Deal targets)

User Dashboard & Monitoring

iBOS energy includes a sophisticated dashboard that offers real-time energy and indoor climate insights. It can also generate alarms for deviations from targets. On top of that, iBOS energy has intuitive graphs for monitoring of indoor climate, energy usage, and HVAC performance. Using historical data analysis, iBOS Energy also illustrates the current energy usage in the building compared to what could be expected without iBOS Energy installed.

Future-Proof & Scalable

With support for open standards (BACnet, M-bus, Modbus, etc) and seamless integration with IoT sensors, iBOS energy is built for long-term innovation and flexibility. Whether you manage one building or a global portfolio, iBOS energy adapts to scale and complexity. iBOS energy is also sold with iBOS connect, a service that provides users with secure remote access to the building and its data. As a potential add-on, the customer could also choose to use the edge BMS.

One factor that can have a significant impact on the choice of a supplier is the ability to offer integrated solutions. Many companies prefer to avoid the complexity that can arise when dealing with multiple suppliers within their system. The advantage of having a single supplier that can provide a comprehensive BMS solution should not be underestimated.



Conclusion

iBOS energy enables you to **change today and impact tomorrow**. By reducing

energy consumption, lowering emissions, and optimizing comfort, iBOS energy is helping shape the future of sustainable, innovative buildings.

iBOS Energy - part of the iBOS portfolio

iBOS Nexus is a secure edge gateway that enables safe access to innovative applications within your building without exposing them to the internet. Once the iBOS Nexus is installed, your building can be accessed remotely via iBOS Connect, an intuitive and secure portal for managing your building portfolio and its services.

iBOS connect is an intuitive, secure solution designed to elevate your building into an intelligent, innovative ecosystem filled with valuable tools and services. iBOS connect securely connects your building to the cloud, giving you a new level of visibility into your building and its services, from any device, remotely. As a powerful standalone solution, iBOS connect facilitates digitizing and automating building operations. With Nexus and Connect in your building, you are just one small step away from adding innovative services like iBOS

energy and other future digital solutions.

iBOS energy is a cutting-edge energy optimization software that integrates seamlessly with existing or new HVAC systems, helping property owners significantly reduce energy consumption 24/7, while maintaining optimal indoor comfort. iBOS energy has been on the market since 2008 and is deployed in over 1,000 buildings globally. By combining self-learning algorithms, predictive weather analysis, and thermal mass modelling, iBOS energy has been proven to deliver consistent energy savings of up to 40%. What sets iBOS energy apart in the market is its advanced edge computing, including thermal mass utilization, weather-based adaptations, and one-level control, which many legacy systems lack or underutilize. Easily accessible remotely via iBOS connect, a facility team can monitor real-time and historical impact in an intuitive dashboard.

iBOS edge BMS is an innovative Building Management System, seamlessly installed on iBOS Nexus and designed to modernize building monitoring and control. With an intuitive user interface, users can effortlessly access controls and monitoring systems and make desired adjustments.

