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iBOS energy –
Smart building management

Over 15 years of energy savings and improved indoor climate

Smarter Energy Optimization with iBOS energy: AI-Driven HVAC Management for a Sustainable Future

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 increases, making optimization go beyond cost savings—it has become central to sustainability and resource efficiency. Fuelled by rising 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 they increase the value of the property.

The emergence of next-gen technologies—AI-driven software and IoT-enabled systems—transforms HVAC operations through real-time, dynamic control, boosting performance and sustainability. These tools significantly cut energy use while improving efficiency and contributing to a longer life-time of the installed HVAC systems by running them in smarter ways.

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% savings have been recognized. iBOS energy optimizes not only on heating – but also on cooling and ventilation. What further sets iBOS energy apart is its advanced edge computing, with thermal mass utilization, adaptations based on weather forecasting and zone-level control, which many legacy systems lack or underutilize.

Let's optimize, automate and enhance!

Background:

Buildings are among the largest consumers of energy, accounting for nearly 40% of global CO_2 emissions. Approximately 30% of energy used in commercial buildings is wasted, and there are substantial savings by using 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 over usage of the systems, unnecessary energy consumption, high operational costs, and uncomfortable indoor environments.

Market Landscape: Energy Optimization Systems

The latest trends in smart buildings are focused on enhancing efficiency, security, and sustainability in buildings by integrating advanced technologies and innovative solutions. It is important to note that there are several factors impacting the energy use in a building, including climate, location, the buildings age and design as well as installed equipment and technology. Some of the recent 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.

Digital Twin: A digital twin is a digital representation of a physical building. It is used to monitor and simulate the building's performance in real-time, allowing for 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 methods, and access control systems.

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—real-time edge computing (for reliability) plus cloud analytics (for portfolio-wide insights).

These trends in smart buildings demonstrate a clear 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. It is evident that the demand for green properties will continue to rise in the future. This can be attributed to several significant factors, including increased awareness of sustainability, the economic incentives associated with green properties, and the growing legislation promoting environmentally friendly construction and management practices. This trend is particularly clear in the market analysis and is confirmed by players in the real estate industry, including investors and competing companiesThis is fueled by:

- **Regulatory pressure** to reduce carbon emissions (e.g., EU Green Deal, U.S. Inflation Reduction Act, Canada's Net-Zero targets)
- **Rising energy costs** pushing companies to find efficiency gains
- **ESG (Environmental, Social, Governance)** requirements driving investment in smart energy management
- **Corporate net-zero goals** 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 a 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 if there is a large potential in the market with the new technology emerging, there are also challenges related to complexity of older buildings and retrofit environments, and lack of skilled professionals to manage advanced systems.

There are also integration challenges across fragmented hardware/software ecosystems and no industry wide standard applied for set-ups and system configurations.

Often 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 products that continuously evolve with new features and updates during their lifespan, making sure that the building stays updated with the latest security patches and services.

A smart AI-driven approach to HVAC optimization

The iBOS energy Solution

iBOS energy® optimizes your HVAC-systems 24/7 through intelligent control and adaptive energy management and provides comprehensive and actionable information on all your buildings. Harnessing the power of predictive weather, indoor temperature, and the thermal mass of the building, the intelligence in iBOS energy® updates the existing HVAC-systems with new parameters and settings 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.

iBOS energy offers a smart 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 buildings 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 updated 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 refers to algorithms and 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 climate in a building 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 as well as forecasts and previous outcomes to calculate how the property reacts to the 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. EU's Green Deal targets)

User Dashboard & Monitoring

iBOS energy includes a sophisticated dashboard that offers real-time energy and indoor climate insights. It also has a possibility to generate alarm 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 adapts to scale and complexity. iBOS energy is also sold together with iBOS connect, a service that gives the user secure remote access to the building and its data. As a potential add-on, customer could choose to also 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 smart and sustainable buildings.

iBOS Energy - part of the iBOS portfolio

iBOS nexus is a secure edge gateway that enables safe access to smart applications within your building - without exposure to the internet. Once iBOS nexus is installed, your building is reachable remotely via iBOS connect, an intuitive and secure portal for managing your building portfolio and its services.

iBOS connect is an intuitive and secure solution designed to elevate your building into an intelligent and smart ecosystem, filled with useful tools and services. iBOS connect securely connects your building to the cloud, giving you a new level of visibility of your building and its services, remotely and from any device. As a powerful
standalone solution, iBOS connect facilitates digitising and automising building operations. With the Nexus and Connect in your building, you are one small step away from adding smart services like iBOS energy and other future digital solutions to your building.

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, reaching as high as 40%. What sets iBOS energy apart on the market is its advanced edge computing, with thermal mass utilization, adaptations based on weather forecasting and zone-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 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, monitoring systems, and make desired adjustments.