ADVANTECH
Enabling an Intelligent Planet
The WISE-IoT Magazine

Energy Management

Greenflation: The Enlightenment of Smart Parks

Application Story

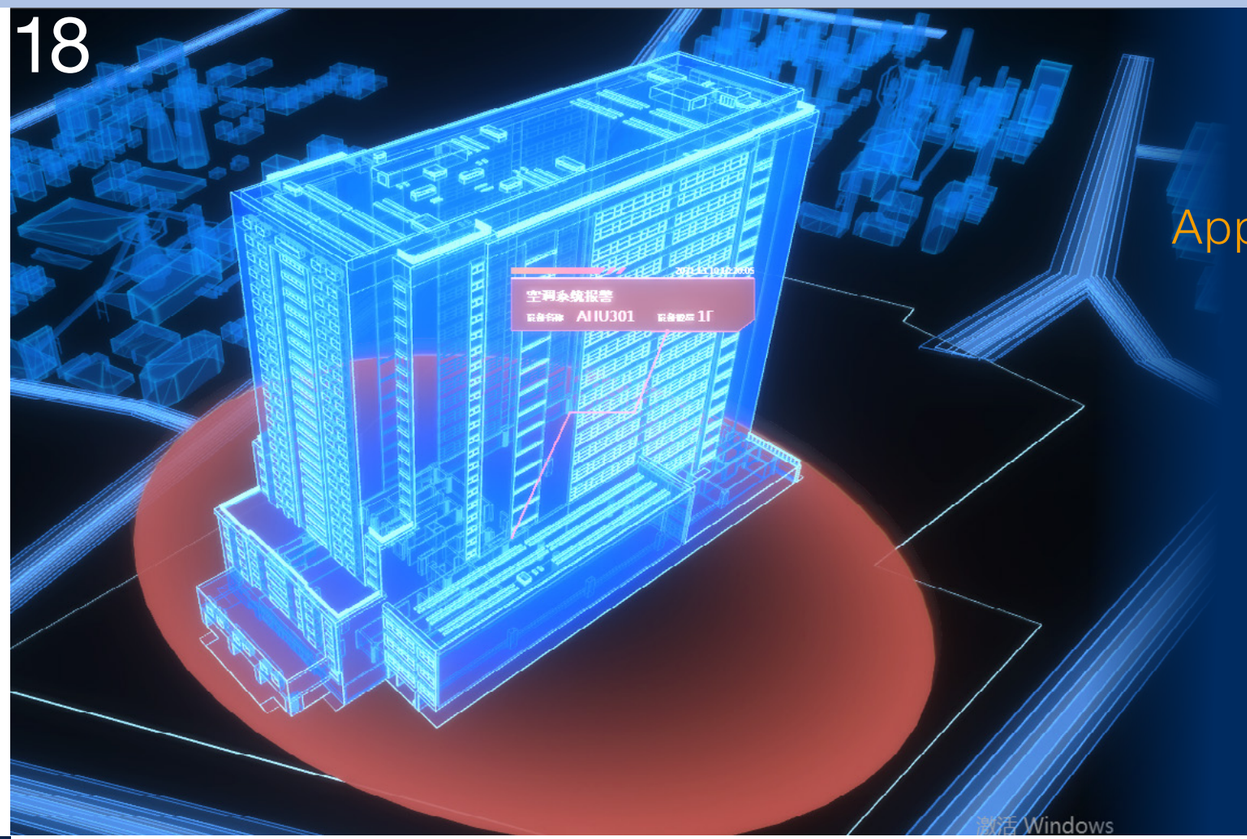
Green Recovery Starts with Smart Buildings

P.18

Advantech's Linkou Intelligent Campus Exhibits Environmental Sustainability

P.15

CONTENTS



Published by
Advantech Co., Ltd.

Publisher
K.C. Liu

Address
No.1, Alley 20, Lane 26, Rueiguang Road,
Neihu District, Taipei, Taiwan 11491
Tel +886-2-2792-7818
Website www.advantech.com

Editorial Supervisor
Brand Development & Public Relations,
WISE-IoT Marketing

Edit Production
Herdo Integrated Marketing Co., Ltd.

Initial Issue2007.09.15

Advantech iEMS Solution: Empowering the Energy-Saving Industrial Revolution

Advantech adheres to the spirit of altruism and works to create a sustainable living environment for our next generation through delivering comprehensive energy automation solutions. From all aspects including factory operations, smart buildings, water resource treatment, and other areas, we understand and embrace our social influence as a leading enterprise and seek to establish sustainable development models in all of our operations.

Applicable International Standards:

- ISO 14064 Greenhouse Gas Inventory
- ISO 14067 Product Carbon Footprint Certification
- ISO 14046 Water Footprint Inventory
- ISO 46001 Water Efficiency Management Systems
- ISO 20400 Sustainable Sourcing Guidelines
- ISO 50001 / 50006 Energy Management Systems

iEMS for Buildings

- Energy use intensity/per capita energy consumption
- Equipment energy efficiency diagnosis
- Multidimensional electricity consumption prediction
- Energy cost management

"Reduce Building Operation Costs"

HVAC Energy-Efficiency Tuning

- Energy station management
- Energy efficiency diagnostic analysis
- Running parameter tuning
- Economic operation evaluation
- AI energy load forecasting

"Conserve Energy by Improving HVAC Efficiency"

Carbon Asset Management

- Carbon footprint inspection
- Carbon emission analysis
- Carbon quota management
- Carbon neutrality planning

"Comply with Global Greenhouse Gas Standards"

iEMS for Factories

- Production line/team energy consumption statistics
- Output value/unit consumption analysis
- Demand monitoring
- Contract capacity forecasting

"Optimize Manufacturing Energy Costs"

Water Resource & Water Treatment

- Energy use intensity/per capita energy consumption
- Equipment energy efficiency diagnosis
- Multidimensional electricity consumption prediction
- Time-of-use payment

"Advance Water Efficiency & Sustainability"

Pursuing the Vision of a Zero-Carbon-Emissions Future

Photos provided by Advantech
Interview with Gaven Chang, Director of Sustainability and Climate Change of PwC Taiwan; Jichao Liang, R&D Director for WISE-PaaS of Advantech; Willie Lin, Director of WISE-AII (Advantech Industrial Intelligence) of Advantech

The industrial and building sectors are among the leading generators of carbon emissions. In an effort to reduce global emissions, governments and organizations around the world have begun implementing relevant policies and initiatives. In many industries, reducing carbon emissions is now considered essential for achieving sustainable operation.

As highlighted by Gaven Chang, Director of Sustainability and Climate Change at PwC Taiwan, industry is responsible for up to 40% of global carbon emissions, while the building sector accounts for another 30%. Therefore, industrial energy conservation and building energy management are crucial to the pursuit of a zero-carbon-emissions future.

Technology empowers industry to reduce carbon emissions

Technology is crucial for reducing carbon emissions. In the "Net Zero by 2050" roadmap released by the Taiwan government in April 2022, two main approaches are adopted; one of which involves the extensive application of technology. Additionally, China's "dual carbon" goals advocate the broad use of new information-processing technologies in emerging energy management scenarios.

According to Jichao Liang, R&D Director for WISE-PaaS at Advantech, global tech companies are accelerating the pace of technology and solution development in order to realize a zero-carbon planet. In fact, Advantech has actually adopted "creating a more sustainable and intelligent planet" as its company mission. Accordingly, Advantech offers various smart applications and solutions for both the supply side and the demand side, collaborating with partners in multiple industries to achieve energy conservation and carbon emission reduction goals.

"Industry is responsible for up to 40% of global carbon emissions, while the building sector accounts for another 30%. Therefore, industrial energy conservation and building energy management are crucial to the pursuit of a zero-carbon-emissions future."
- Gaven Chang, Director of Sustainability and Climate Change of PwC Taiwan

Trends in technology supply and demand

"When applying science and technology to smart energy conservation, both energy supply and user demand must be considered," said Mr. Chang. On the supply side, the ever increasing global use of renewable energy emphasizes the importance of solutions such as energy storage systems, smart grids, and smart meters. As a result, upstream and downstream manufacturers are actively investing in the development of new technologies and products related to smart energy management. Meanwhile, trends in user demand are driving the industry and building sectors toward digitalized management of energy consumption.

To provide an example of industrial energy conservation, Willie Lin, Director for WISE-AII (Advantech Industrial Intelligence) at Advantech, cited the European Commission's carbon border adjustment mechanism (CBAM) plan. Under this plan, tariffs will be imposed on products imported from countries with less regulations regarding carbon emissions, pollution, and environmental protection.

The full implementation of CBAM is expected to occur in 2026, following a three-year adjustment period beginning in 2023. Initially, CBAM will apply to five sectors considered to be at high risk of carbon leakage – namely, the cement, iron and steel, fertilizer, aluminum, and electricity sectors. However, from 2026, declarations of

embedded emissions will be required for all products entering the EU, and suppliers must pay relevant carbon tariffs to obtain a carbon permit for such products. This clearly indicates that industries must accelerate the promotion of energy conservation through digitalization.

iEMS business opportunities expected to explode

According to Fortune Business Insights, the global energy management system (EMS) market is expected to grow from US$27.31 billion in 2022 to US$60.54 billion by 2029, with a CAGR of 12.0% during this period. Indeed, the technological research firm Gartner also reported rapid growth for the EMS market.

Mr. Lin explained that intelligent EMS (iEMS) solutions optimize energy management in factories and industrial facilities by enabling near real-time data collection, analysis, and response across multiple devices and locations. This effectively reduces energy waste through close monitoring and management of energy consumption.

To support the demands of various industries, Advantech offers on-site iEMS installations that help enterprises save 15% ~ 25% in energy costs by increasing efficiency and reducing waste. Advantech's iEMS is an open system that allows co-creation partners to offer value-added solutions to diverse customers ranging from small businesses to large manufacturers and corporations.

Connecting ecosystem partners

Due to the wide scope of intelligent energy conservation, entire industries must form complete ecosystems to achieve carbon emission reduction goals. Mr. Liang asserts that the energy industry's ecosystem and regulatory environment are both evolving rapidly. Moreover, because the emergence of new suppliers, delivery methods, technologies, and working models have made the ecosystem more complex, the entire industry chain must increase its collaborative efforts.

Mr. Chang believes that system integrators, control system suppliers, and smart sensing equipment manufacturers play the three most important roles in the energy ecosystem. Therefore, they must cooperate closely to develop and deploy intelligent energy conservation systems aimed at specific sectors.

As a leading IoT solutions provider, Advantech connects the three key contributors through co-creation. Over the last five years, Advantech has leveraged decades of experience with industrial-grade servers and edge computing solutions to develop an industrial IoT platform and various energy conservation solutions. The competitiveness of Advantech's software, hardware, and system platforms facilitates collaboration with multiple partners, such as DFSIs and sensor manufacturers, and enables the provision of comprehensive system architecture as well as solutions that promote intelligent energy conservation from the edge to the cloud.

Mr. Lin added that Advantech's sustainable development ecosystem can help to upgrade the manufacturing industry through the WISE-PaaS platform. Together, ecosystem partners can provide solution-ready packages that enable sustainable management and integrate virtual data lakes in order to accelerate development. Advantech's WISE-AII solution also includes both OT and IT systems to facilitate the provision of more comprehensive solutions.

Reducing carbon emissions is a global responsibility, and Advantech is utilizing smart technology to collaborate with partners in the promotion of sustainability. ■

Enabling an Intelligent and Sustainable Planet

ADVANTECH
Enabling an Intelligent Planet

Advantech's hardware, software, I.Apps, and automation solutions consist of various products and services designed for specific applications such as in energy, flood and disaster prevention, sewage treatment, remote education, public safety and health, telemedicine, cold chain management, smart agriculture, information security, and cloud computing.

In 2020, our worldwide revenue for the sale of products used for sustainable purposes accounted for 15.79% of our total revenue. In the future, we aim to incorporate sustainability concepts into our strategy blueprint for developing new products. We will continue to develop smart solutions to make the world cleaner, safer, healthier, and more convenient — enabling an intelligent and sustainable planet.

www.csr.advantech.com/en-us

Advantech ESG Spotlight

Energy Management Products

Intelligent Energy Management Solution (iEMS) for Buildings

Overview

Advantech's Intelligent Energy Management Solution (iEMS) for buildings is a domain-focused product that monitors and manages the usage of internal building utilities. It is designed to coordinate management between equipment, people, and energy.

Application Scenario

TA1: For building managers

iEMS integrates hardware and software within industrial applications. It enables users to optimize energy usage and reduce waste through analysis, control, and management. This combination of functions improves operation management efficiency, service quality, and operation/maintenance organization management capabilities. Illustratively, when comparing facilities with and without this solution, buildings that adopt this solution save an average of 7 ~ 10% more energy following implementation.

TA2: For information technology engineers

iEMS provides a no-code backend configurable platform. By simply clicking the corresponding buttons, it enables the rapid generation of an organizational structure that delivers a clear operational overview. This feature accelerates energy management strategies and avoids wasteful and excessive energy charges.

Benefits

- Online energy consumption monitoring
- Energy consumption statistics and management
- Energy usage analysis and management

Solution Suite

The iEMS (for Buildings) solution comprises one HCI Server with iEMS.ECOWatch I.App (50 ~ 100 electricity meters or 1500 ~ 2500 tags, depends on case scale).

For small scale enterprises:

Software

iEMS.ECOWatch-lite (50 x electricity meters or 1500 x tags)

Hardware

Edge 110 (2U C624 HCI Server)

- **1 x Intel® Xeon® Silver 4216 processor (16 cores, 22M Cache, 2.10 GHz)**
- **4 x 32GB DDR4 2933 288-pin 2GX4 REG 1.2V**
- **4 x 2.5" 240GB SATA 6Gb/s SSD**
- **4 x Enterprise 3.5" 4TB 7KRPM SATA 6Gb/s HDD**

For medium scale enterprises:

Software

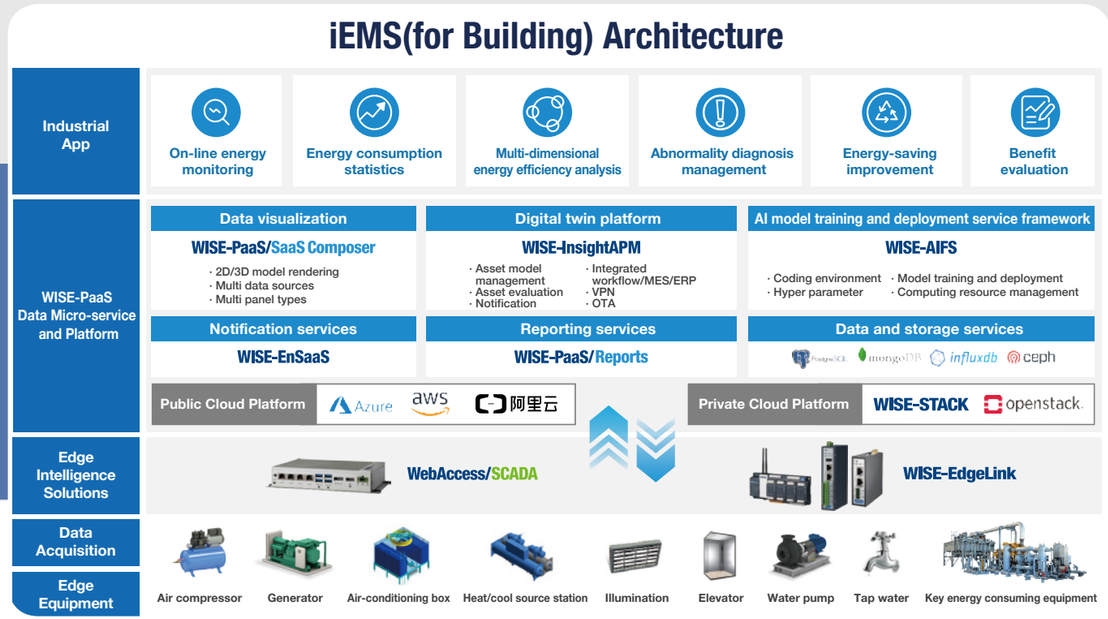
iEMS.ECOWatch-Standard (100 electricity meters or 2500 tags)

Hardware

Edge A100 (2U C624 HCI Server)

- **2 x Intel® Xeon® Silver 4216 processors (16 cores, 22M Cache, 2.10 GHz)**
- **8 x 32G DDR4 2933 288PIN 2GX4 REG 1.2V**
- **4 x 2.5" 240G SATA 6GB/s SSD**
- **4 x Enterprise 3.5" 4TB 7KRPM SATA 6Gb/s HDD**

iEMS(for Building) Architecture



Customer Testimonials

"The iEMS for Buildings technology empowers small- to medium-sized system integrators like NKIOT to take on medium- to large-scale projects."

- Zhu Shu, General Manager of NKIOT

iEMS for Factories
Factory Energy Management Solution

Overview

Based on real-time data obtained from smart meters, iEMS for Factories allows energy-intensive manufacturing owners to monitor energy consumption information, accurately evaluate energy costs, and optimize energy efficiency, thereby aiding business intelligence strategies for energy management.

Application Scenario

TA1: For Factory managers

iEMS for Factories integrates hardware and software within industrial applications where typically a 7-10% energy saving can be achieved in facilities, compared to where iEMS for Factories is not used. Based on real-time data obtained from smart meters, iEMS for Factories allows users to monitor energy consumption information, accurately evaluate energy costs, and optimize energy efficiency, thereby aiding business intelligence strategies for energy management.

TA2: For information technology engineers

iEMS for Factories provides a no-code backend configurable platform. By simply clicking the corresponding buttons, the organizational structure can be quickly generated to get a clear overview of operations. This accelerates energy management strategies and saves on excessive wasteful energy charges.

Benefits

- Accelerate ISO 50001 compliance
- Reduce hidden energy waste
- Instantly eliminate abnormal usages
- Improves energy management efficiency

Solution Suite

iEMS for Factories solution comprises one MIC-770 V2 application service server with real-time monitoring functions, FMS I.App, and 20 ~ 50 licenses for managing meters.

For small scale:

Software

iEMS for Factories I.App: Real-time monitoring with FMS 20 Licenses.

Hardware

MIC-770W-20A1: terminal with Intel® Core™ i5 processor, 16 GB DDR4, SSD 128 GB & HDD 512 GB, and Windows 10

For medium scale:

Software

iEMS for Factory I.App: Real-time monitoring with FMS 50 Licenses.

Hardware

MIC-770W-20A1: terminal with Intel® Core™ i7 processor, 32 GB DDR4, SSD 128 GB& HDD 1T, and Windows 10

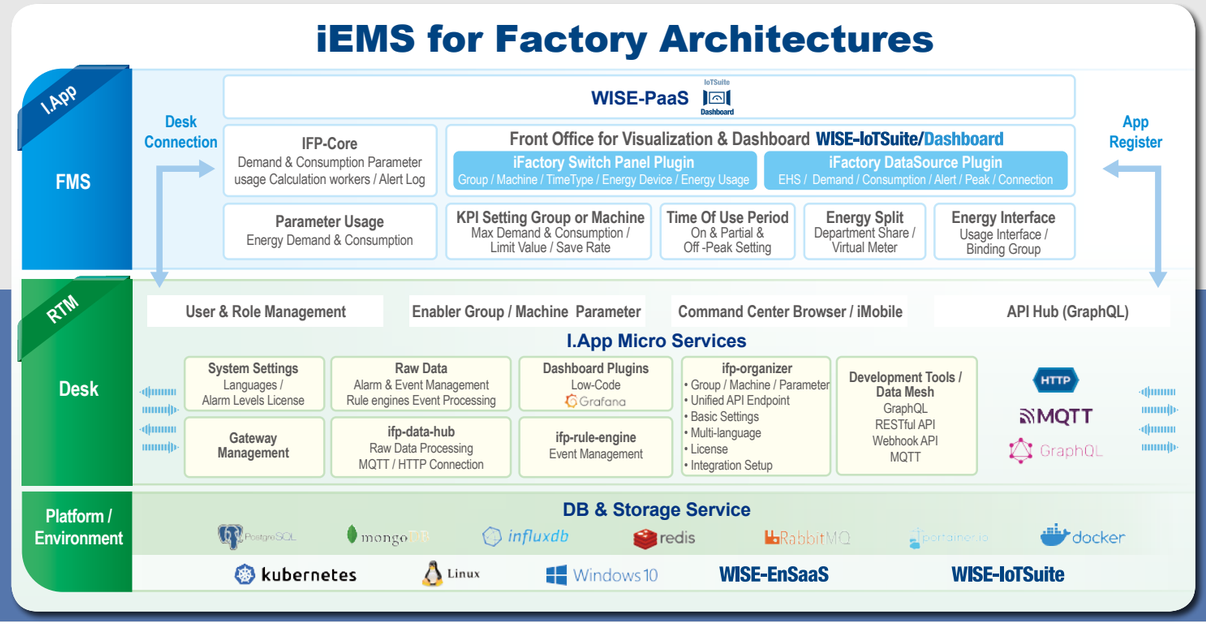
Solutions Page

Customer Testimonials

We now fully understand the power consumption of our factory. We get an overview of all energy consumption, which enables us to analyze energy usage trends more efficiency.

- Zhang Xiaobo, Supervisor of the Information Technology Center of Taichia Glass Fiber Co., Ltd.

iEMS for Factory Architectures



Application Story

Advantech's Linkou Intelligent Campus Exhibits Environmental Sustainability

Photos provided by Advantech
Interview with L. H. Chou, Senior Manager of Advantech; Richard Liu, Senior Engineer of Advantech; Jeter Fu, Senior Specialist of Advantech

Advantech's Linkou Intelligent Campus is a green building structure featuring an intelligent energy management system (iEMS) for energy conservation, which significantly reduces energy consumption and carbon emissions. The site has also helped Advantech become a leading enterprise in environmental, social, and governance (ESG) criteria.

iEMS plays a vital role in campus energy conservation

The construction of Advantech's Linkou Intelligent Campus consisted of three phases. Leveraging various intelligent energy-conservation solutions developed by Advantech, the site has become a benchmark in the field of intelligent green buildings, winning a Platinum Award in the Asia Pacific Intelligent Green Building Alliance (APIGBA) Awards Competition. Its comprehensive, intelligent energy-conservation systems and applications have attracted a stream of visitors who want to learn more about Advantech's philosophy and approach to environmental sustainability.

L. H. Chou, Senior Manager at Advantech, pointed out that Advantech utilized iEMS and intelligent space management as the two central cores to develop seven smart applications, including energy management, human sensing energy conservation, iReception, iMeeting, iSurveillance, Smart Card, and iParking. Furthermore, to achieve unified management covering a wide range of smart applications, Advantech leveraged the industrial IoT application software platform WebAccess to connect multilevel management of facilities distributed in various nodes and originally independent subsystems, thereby realizing efficient and comprehensive energy management.

Mr. Zhou further explained that there are numerous facilities that consume electricity among the large-scale buildings on the Linkou campus, so before implementing the systems, the energy consumption status of all facilities had to be analyzed. Energy consumption benchmarks and energy-conservation performance indicators were set, accomplishing the goal of energy conservation and carbon emission reductions—and iEMS played a crucial role in this process.

Three key solutions in realizing smart management

Advantech's iEMS includes three critical solutions: Energy Management

Solution (EMS), Energy KPI, and Energy Predict. Together, these carry out the intelligent management of the air conditioning, lighting, power, production machines, green energy, and other equipment on campus.

EMS solution monitors the entire campus' operation status of the environment and equipment and presents the overall energy usage on campus through a visualized dashboard interface. This allows administrators to check the energy consumption data of various campus facilities, offering an energy consumption overview, consumption trends, and energy performance statistics. The EMS solution helps operators discover possible energy wastage from the data and deploy maintenance strategies. Energy KPI solution follows the guidelines of the energy performance management indicator ISO 50006 standard to establish energy baselines, energy conservation goals, and energy conservation performance. At the same time, it can detect equipment with abnormal energy consumption in real-time, notify relevant personnel to rectify issues, and establish an effective method of optimizing energy processes. Energy Predict solution can further carry out energy prediction, referring to external factors such as weather, organizational changes, and production schedules, adjusting the energy baseline in more detail, and giving early warnings to predict excessive energy consumption.

For example, sewage sensors on campus failed once, causing the motor of the sewage tank to run continuously; the system detected the abnormal power consumption of the motor and immediately notified relevant personnel to deal with the problem. Another example involved a night-shift worker of a factory on campus who failed to turn off the air handling unit before he got off work; the system detected that the power consumption of air conditioners was too high in the middle of the night, and it immediately notified relevant staff via messaging software.

> *Advantech's iEMS leveraged the industrial IoT application software platform WebAccess to connect the multilevel management of facilities distributed in various nodes and originally independent subsystems, thereby realizing efficient and comprehensive energy management on the campus in a comprehensive manner.*
>
> *- L. H. Chou, Senior Manager of Advantech*

Case Study Benefits

1. Advantech's energy consumption for its offices was down 6.6 percent in 2021.
2. Energy consumption in factory facilities has decreased significantly.
3. Integrates and manages all electricity facilities to save management costs and human resources.

In addition to the intelligent control of individual power consumption facilities, the system intelligently identifies and distributes electricity with the help of iEMS, to manage energy consumption more efficiently. For example, the campus can adopt peak shaving and load shifting strategies to optimize energy usage by better understanding peak and off-peak energy consumption and tariffs.

The iEMS delivers significant energy conservation benefits

The complete implementation of iEMS delivered huge benefits for the energy conservation of the office buildings and factories on campus. Richard Liu, Senior Engineer at Advantech, pointed out that in terms of energy conservation in the office buildings, the system comprehensively and intelligently managed all electrical facilities, including water coolers, split-type air conditioners, air handling units, fan coil units, cooling towers, air compressors, and lighting. Including the Linkou Campus and Advantech's other branches in Taiwan, Advantech's office electricity consumption decreased by 598,868 kWh in 2021, down 6.6 percent compared to 2020.

Regarding energy conservation in factories, Jeter Fu, Senior Specialist at Advantech, pointed out that the iEMS has played a significant role in the energy conservation of individual facilities. For instance, through the intelligent management of the electronics warehouse

of the B1 factory on campus, the temperature of the warehouse can be adjusted automatically according to the season and environmental factors, which saves about 14,000 kWh of electricity annually. Since the implementation of this application, about 52,000 kWh of electricity has been saved, while carbon emissions have been reduced by 27,000 kg. In addition, it has saved nearly 20,000 kWh of electricity annually and reduced carbon emissions by 10,400 kg by leveraging the EMS solution for data monitoring to activate and deactivate the make-up air unit on the fifth floor of the factory. Adding up these figures, a total of about 60,000 kWh of electricity has been saved, while carbon emissions have been reduced by approximately 31,200 kg.

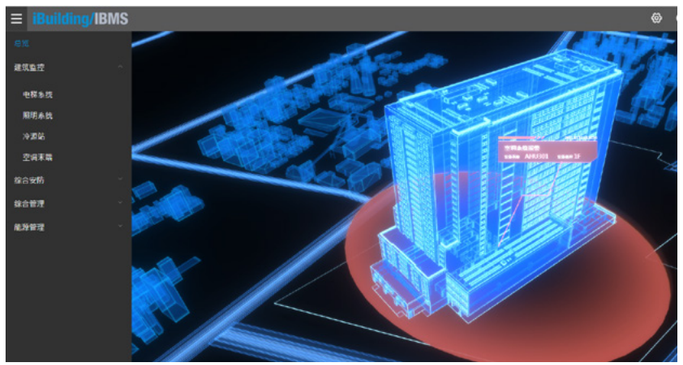
Energy conservation is an endeavor that needs constant attention and improvement. To achieve more comprehensive energy conservation, Advantech has used the iEMS on its campus to connect electricity facilities of other branches in Taiwan, such as the Neihu headquarters, building a comprehensive energy management system and realizing Advantech's philosophy in ESG corporate sustainability. ■

Green Recovery Starts with Smart Buildings

Photos provided by Advantech
Interview with Zhu Shu, General Manager of Nanjing Energy Control Systems

Creating intelligent and efficient energy management practices and realizing sustainable environmental development has attracted a lot of attention worldwide—but we still have a long way to go.

In particular, China's energy consumption is concentrated mainly on three key sectors: industry, transportation, and construction. Among them, the construction industry accounts for about 20% of the country's total carbon emissions. To reduce this, initiatives aimed at minimizing carbon emissions are accelerating in China, with many tech companies invested in the movement. For example, Advantech has engaged in deep collaboration with Nanjing Energy Control Systems (NKIOT) and is committed to utilizing intelligent technology to provide a full range of smart energy management solutions for buildings.



iEMS addresses IoT fragmentation challenges

Zhu Shu, General Manager of NKIOT, pointed out that the process of Intelligentization in the energy sector has been growing steadily. "Demand for intelligent applications in multiple sectors has become more refined and the professional knowledge required to integrate relevant solutions has in turn become more diverse. Therefore, solving IoT fragmentation problems by opening up different industries and connecting different types of devices can accelerate the implementation of smart energy management applications in more sectors. To achieve this, a complete industrial ecosystem is required to support the effort," said Mr. Shu.

To this end, NKIOT and Advantech have cooperated in-depth at the technical level to create a viable energy solution. The company implemented Advantech's iEMS (Energy Management Solution) iApp based on the WISEPaaS platform to customize various building energy management applications for their customers. One solution deployed in a 26-story public building included intelligent monitoring and management systems, such as energy consumption analysis, fire management, equipment asset management, HVAC management, and computer facility management, enabling the effective management and analysis of the total energy consumption for the building.

> *With the technology of the iEMS platform, small and medium-sized system integrators like NKIOT can also take on medium and large-scale projects.*
>
> *- Zhu Shu, General Manager of NKIOT*

The solution uses the ECU-1051 IoT gateway and WISE-Edgelink edge software to collect data from PLCs through the MODBUS/TCP protocol. The data is transmitted via 4G to a cloud platform using the MQQT protocol, then the HPC-7282 lightweight server is employed to establish a private cloud to ensure data safety and integrity.

Deepening collaboration between the two companies

Notably, iEMS's integrated equipment life cycle, building and energy, smart property, and smart security management systems are used in conjunction with other applications for real-time monitoring and management of many of the building's systems, including its power supply and distribution, cold/heat source, HVAC, elevator, fire protection, water, and access systems. This setup permits remote operation and maintenance while minimizing unnecessary energy consumption costs, conserving human resources, and significantly reduces operational and maintenance costs.

"Advantech's iEMS has helped us deploy smart applications faster and has significantly sped up our project completion times," Mr. Zhu emphasized. He also noted that with smart buildings set as a starting point, future collaboration between Advantech and NKIOT will more deeply explore overall energy management at the service level. They expect that the implementation of applications will now be more refined, allowing the industrial ecosystem to become richer, more prosperous, and more aligned with their goals. ■

Solution and Benefits

iEMS permits the interconnection of different subsystems on the same user interface by integrating all various subsystems within a building. Powered by AI, digital twinning, remote operation and maintenance, the solution provides building managers and users with better support for operational tasks and maintenance decisions while improving the user experience.

Advantech's iEMS Helps Improve Industrial Park Energy Efficiency

Photos provided by Advantech

Buildings are some of the largest energy consumers in the world and building-energy conservation is a vital factor in reaching energy and emission reduction goals. Hence, the Shanghai Lingang Pilot Free Trade Zone operators are committed to creating a new generation of smart, self-sustaining, green industrial parks through the integration of emerging IoT and renewable energy technologies.

Digitally twinning a digitalized smart industrial park

An industrial park faced multiple energy management challenges before they decided to implement a smart energy-saving solution. These challenges related to solar and wind power generation as well as the independent operation of other systems, such as energy storage, lighting, and air conditioning. Additionally, because equipment is typically scattered across a wide area, it cannot be managed via a single unified platform. This meant that locating malfunctioning equipment and identifying conditions on site and in real-time was extremely difficult. Accordingly, routine operations and maintenance relied primarily on time-consuming, laborious, manual inspections.

However, the implementation of smart energy-saving technologies helped to address these challenges. Indeed, distributed photovoltaic and wind power generation systems, as well as energy storage systems, were constructed on unused land in the park. These systems were combined with Advantech's smart energy management solution powered by the WISE-PaaS industrial IoT platform. This combination enabled the park to establish a new energy management solution and achieve effective energy management and control.

The design of Lingang Industrial Park's energy management system was based on Advantech's WISE-InsightAPM app — a digitally twinned low-code platform under the WISE-PaaS suite. The solution is designed to support edge sensors that collect data from more than a dozen subsystems, including energy storage solutions, air conditioning systems, lighting systems, elevators, IT equipment, and distributed photovoltaic/wind power generation facilities. The park leveraged IoT and cloud technologies for unified control by facilitating the intelligent management of individual subsystems via a unified cloud management platform connected to different systems.

Case Study Benefits

- Yields a 40% increase in building and maintenance efficiency and a 60% reduction in complaints
- Saves up to 3,000 kWh of electricity per building per month

Solution and Benefits

Advantech's iEMS solution is also suitable for applications outside of smart industrial parks. Indeed, this solution has been deployed in medical institutions, residential communities, and commercial centers to enable centralized remote monitoring of building operations and maintenance.

iEMS reduces labor costs by 40%

Advantech's iEMS (intelligent energy management solution) supports the operation, control, and management of park systems and equipment via a single unified platform. For example, when the platform detects an abnormality on an air conditioning system component, it will locate the faulty device, send a notification via SMS or mobile app, and dispatch an operations and maintenance work order. All of these tasks are performed automatically by the system, minimizing human resource requirements and operations costs. These optimizations yield a 40% increase in building and maintenance efficiency, and a 60% decrease in complaints.

Since implementing the Advantech's iEMS solution, Lingang Industrial Park saves up to 3,000 kWh of electricity per building per month. Moreover, CO_2 emissions have been reduced by 3 tons, roughly equivalent to the carbon absorption of 160 trees. Accordingly, this project marks a significant achievement in achieving buildings with low energy consumption and low carbon emissions.

In terms of the future, a safer, more convenient, energy-efficient environment will be valued more than ever. As a top industrial solution provider, Advantech will continue to work closely with its partners to expand energy management solutions to additional sectors and industries. ■

Application Story

iFactory Assists EMS Factory in Smart Energy Management

Photos provided by Shutterstock

According to World Energy Outlook 2021, energy consumption by the industrial sector accounts for 40% of total global energy consumption and this is dominated by fossil fuels, resulting in high carbon emissions of 8.7 billion tons, which is second only to the levels generated by the power sector.

To reduce industrial energy consumption and achieve carbon emission reduction goals, major economic blocks such as the EU, as well as organizations including the UN, have set out agreements and norms aimed at reducing emissions. For example, the European Commission announced its Fit for 55 plan in 2021, with the expectation that the EU will reduce its net greenhouse gas emissions by at least 55% (relative to 1990 levels) by 2030.

To achieve these carbon reduction goals, manufacturing plants worldwide have adopted smart technologies and solutions to improve their energy management. For example, a well-known Taiwanese electronics manufacturing service (EMS) foundry has adopted Advantech's iFactory Energy Sustainability Management Solution in its factory in Mexico to accelerate regulation compliance.

Modular I.Apps provide flexible features

Despite most factories having sufficient resources and capabilities to develop effective energy management systems, the time it takes to do so still incurs a considerable expense. Therefore, most businesses are constantly looking for solutions that can be implemented quickly at lower cost.

Advantech's IFS-51A-EGW1 iFactory Energy Sustainability Management Suite is a complete solution that integrates software, hardware, and various systems. Using data acquired by IPCs at the edge, the suite utilizes modular I.Apps that allow companies of all sizes to flexibly select which features they want to implement based on their needs, which is why this particular EMS factory sought to implement Advantech's solution.

To date, the factory has integrated and implemented three I.Apps. These allow factory personnel to monitor energy consumption in line with their management system and accurately assess their energy costs while optimizing energy efficiency. Ultimately, it helps them realize a sound business intelligence strategy in energy management. First, the EMS I.App monitors energy consumption, optimizes energy usage, reduces energy waste, and minimizes costs. Second, the Energy KPI I.App, which complies with ISO 50006 for setting energy efficiency management key indicators, provides an effective method for optimizing energy processes, and this can be leveraged in making critical judgments in production processes in order to understand possible causes of waste and make timely improvements. Third, the Predict I.App combines statistical models and can also expand on or add AI for performing energy demand analysis, thereby helping businesses work out their energy baselines and use them as a strategic basis for energy management.

Case Study Benefits

- Enables factory energy management without a large capital investment while also reducing energy waste costs by 8% to 13%.
- 24/7 monitoring of factory energy usage helps operators respond quickly to abnormalities.
- 7-day energy consumption forecasting helps avoid exceeding the contracted energy capacity.

Solution and Benefits

iFactory's IFS-51A is a complete solution that integrates software, hardware, and various systems. It can swiftly acquire information from facilities, obtain real-time data from smart meters, and help comprehensively master analytical data and smart factory energy management through data visualization and dashboard management.

Meeting the all-round needs of enterprises with multiple suites

In addition to the IFS-51A-EGW1, Advantech's iFactory also has the IFS EGM Starter Suite and IFS-51C Data Center Suite, which provide enterprises with even more options and allows factories to determine their own most suitable energy management solution. This means that factories are more able to quickly respond to international environmental norms while also reducing their energy costs, thus helping them achieve carbon emission reductions and meet social responsibility goals at the same time. ■

Striving for Zero-Energy Buildings

Photos provided by TC Intelligent Technology
Interview with Jonathan Chen, General Manager of TC Intelligent Technology

According to the International Energy Agency (IEA), buildings worldwide consume more than 40% of the world's energy in their overall life cycle, largely due to material usage and power consumption. They also account for 30% of all greenhouse gas emissions, which contributes to global warming and creates a tremendous burden on the environment. Designing energy-efficient buildings is therefore an imperative. As an example of initiatives aimed at making energy-efficient buildings a norm, the European Union has stipulated that all new buildings from 2021 must be nearly zero-energy buildings (NZEBs).

Technology is undoubtedly the most critical tool in realizing NZEBs. Accordingly, TC Intelligent Technology has cooperated with Advantech to create all-around smart building solutions that integrate software, hardware, and cloud platforms to implement intelligent energy-saving management mechanisms in new and old buildings.

In-depth collaboration between TC Intelligent Technology and Advantech

TC Intelligent Technology provides smart solutions that cover the entire life cycle of buildings, all the way from feasibility studies, conceptualization and design, through to construction, commissioning, operation, and maintenance. To achieve smart building management, they utilize IoT, AI, building information modeling (BIM), intelligent video surveillance (IVS), and intelligent building management systems (iBMSs). These technologies are thoughtfully integrated into building systems including electrical, air conditioning, water supply and drainage, fire protection, and lighting. Smart management essentially makes a building's maintenance and operations more efficient while simultaneously achieving energy conservation and a safer, more comfortable working environment for occupants.

"Utilizing IoT, AI, BIM, IVS, and iBMS solutions as the core foundation, TC Intelligent

Technology has collaborated in-depth with Advantech in promoting building energy conservation," stated Jonathan Chen, General Manager of TC Intelligent Technology. He pointed out that over the past ten years, they have regularly embraced Advantech's industrial-grade hardware products, such as industrial computers, gateways, and ADAM digital I/O modules, when integrating building automation, solar monitoring, and factory automation systems. They have opted to work with Advantech because of the company's reputation for reliability and low failure rates of its products, as well as their long life expectancy and durability in harsh environments. In recent years, they have further applied Advantech's built-in WISE-PaaS Industrial IoT platform and WebAccess software to their smart energy-conservation buildings, as these create a complete solution and provide intelligentization in building energy-conservation applications.

> *Advantech's edge device product lines and maturity of the WISE-PaaS platform make it easier to integrate different sensors and devices and implement more diverse AIoT solutions.*
>
> *- Jonathan Chen, General Manager of TC Intelligent Technology*

Achieving multiple applications

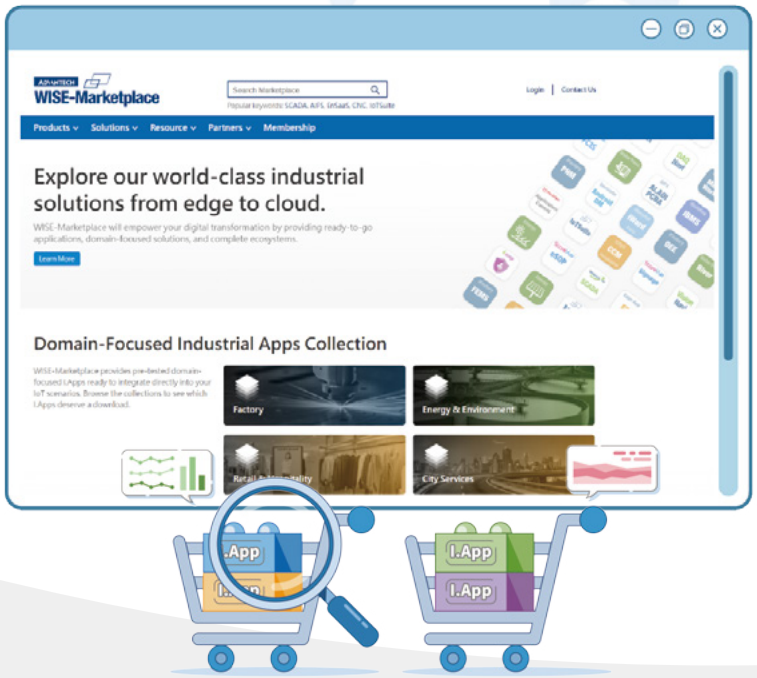
TC Intelligent Technology and Advantech have realized many smart building energy-conservation projects that have elevated their customers' operational competitiveness while significantly reduced carbon emissions. For example, they assisted a large-scale Taiwanese research institution in managing their computer facilities in different counties and cities by implementing an iBMS based on the WISE-PaaS industrial IoT platform. The system gives a complete overview of all operations and allows the institution to centrally control and manage all of their computer facility infrastructure, energy consumption, inspections, and work orders through a centralized command center. This enables administrators to monitor changes and trends in environmental and equipment status in real time from a 3D visualized dashboard, which assists decision making, improves maintenance and operational efficiency, and shortens response times to faults or alarms.

"Even now, our collaboration with Advantech is becoming increasingly closer," emphasized Mr. Chen. He attributed this to the comprehensiveness of Advantech's edge device product lines and maturity of the WISE-PaaS platform, which makes it easy to integrate different sensors and devices and implement additional AIoT solutions. "Importantly, the 3D dashboard really satisfies customer needs and is highly conducive to promoting smart energy-conservation applications," said Jonathan.

As BIM gradually becomes a fundamental application for all buildings, Advantech and TC Intelligent Technology will continue to collaborate closely and develop new smart applications that realize NZEBs, thus helping to reduce carbon emissions for a more sustainable environment. ■

Empower Your Digital Transformation Journey with

ADVANTECH
WISE-Marketplace



Transparent Pricing
Friendly pricing models with flexible payment methods to meet the needs of a wide variety of users.

Complete Modules
Full-range of AIoT modules with transparent information to evaluate.

Shorten Development
No need to develop from scratch by leveraging Advantech and partner's toolkits.

Increase Revenue
Domain know-how involvement to optimize solutions and increase revenue.

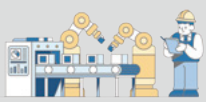
Support Mechanism
Full support for payments, delivery, deployment, technical training, and more.

Co-create Ecosystem
Become a partner to enjoy the best benefits and leverage Advantech's ecosystem.

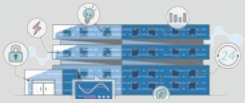
ADVANTECH
Enabling an Intelligent Planet

WISE-Marketplace unlocks innovation with world-class solutions from edge to cloud.

WISE-Marketplace offers ready-to-go applications, software apps, and hardware devices to facilitate your digital transformation through IoT, edge networking, data analytics, and AI. You can explore our products and services online, request demonstrations, and test them in your own systems and operations. Through Advantech's comprehensive ecosystem, WISE-Marketplace can empower your digital transformation!


iFactory

Water Treatment


iBuilding


Renewable Energy


iCityServices


iRetail & Hospitality


iHospital

wise-paas.advantech.com

Explore Now!

8600000586