

Energy Management

Creating a Sustainable Planet with Ecosystem Partners



Application Story

Vishay Leverages Advantech's
WISE-iEMS for Energy Management
Solutions across Asia-Pacific
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WISE-iEMS Facilitates
Energy Conservation and Carbon
Reduction Goals for YC Group
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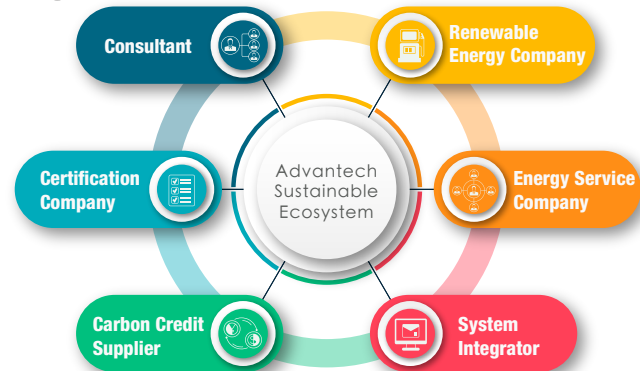
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Published by
Advantech Co., Ltd.

Publisher
K.C. Liu

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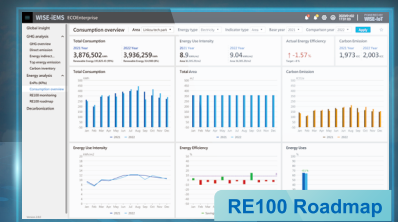
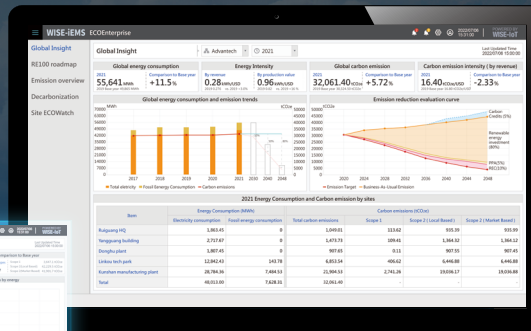
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Edit Production
Herdo Integrated Marketing Co., Ltd.

Initial Issue 2007.09.15
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iEMS/ECOEnterprise: Carbon, Energy & Energy Efficiency Management

Achieving ISO 14064 / ISO 14067 & Sustainability KPI Management



ECOEnterprise



Build Company
Carbon Inventory Easily



Accelerate Communication
with Various Dashboards



Set Reduction Targets &
Track Performance Easily



Find Carbon
Emitting Hotspots

ADVANTECH

Enabling an Intelligent Planet

Systematic management of necessary data, automatic error detection, and carbon inspection logic, greatly reduced the cost, time, manpower, communication, and shortened the overall disclosure and audit process. All levels of the organization have a standard basis to implement sustainable decision-making, assess climate risks, and more appropriately invest in projects and allocate resources.

- ✓ Easy KPI Settings
- ✓ Multiple Data Acquisition Channels
- ✓ Performance Tracking
- ✓ Quick Carbon & Energy Flow Review
- ✓ Compliance with ISO Standards

Organization carbon inventory process



Explore
iEMS/ECOEnterprise

Empowering Businesses on Their Journey Towards Sustainability

As the world's largest industrial computer and IoT solutions provider, Advantech is firmly committed to realizing its own carbon reduction objectives. The company actively practices energy conservation, with a specific focus on factories and the service sector. This endeavor involves harnessing the potential of IoT technology and leveraging their dedicated solution known as WISE-iEMS.

This edition centers around the concept of reducing corporate carbon emissions and driving transformation, offering comprehensive perspectives on the worldwide shift towards achieving net-zero emissions. It also delves into the strategies adopted by businesses for intelligent energy management. Veronica Lin, Senior Director of WISE-iEMS at Advantech, discusses topics such as ESG, net-zero emissions, and carbon neutrality. She also spotlights the sustainable ecosystem created by Advantech in collaboration with its partners, which offers comprehensive solutions to assist companies in reducing their carbon footprint. Meanwhile, Brian Lin, Senior Director of ESG Strategy and Sustainable Development Division at Ernst and Young, examines the contribution of carbon pricing in transforming emission pathways towards net zero emissions.

We also look at how manufacturers from different sectors—such as the US semiconductor giant Vishay Intertechnology, the world's largest producer of PVC and OPP tapes YC Group, and

the Chinese power transmission and distribution giant Chuan Kai Electric—utilize Advantech solutions to establish energy management solutions on their path toward carbon reduction. YC Group set a goal of reducing power consumption by 30 percent within five years. One of its strategies is to implement Advantech's iEMS/ECOWatch for energy management. Chuan Kai Electric, as part of its green transformation strategy, not only utilized Advantech's IoT platform and development tools to develop secure, low-carbon, and efficient smart solutions but also implemented their WISE-iEMS smart energy management solution in its Chengdu production park to create a low-carbon industrial campus.

Given the diverse range of technical expertise required for corporate carbon reduction, Advantech takes a proactive approach by forming strategic partnerships with service providers within the energy-saving and carbon-reduction sectors. This collaborative effort aims to establish a resilient and sustainable ecosystem.

Remaining current with the latest energy conservation and carbon reduction trends and recognizing the most suitable energy management remedies are essential for businesses to address the operational challenges posed by carbon reduction. By embracing energy conservation and carbon reduction, enterprises can make substantial contributions to the sustainability of our planet. ■

WISE-iEMS: Intelligent Energy Management Total Solutions

Empower ESG, Carbon-Neutral, and Net-Zero Capabilities



Executives,
ESG Department

ECOEnterprise

Facilities Management Department

ECOWatch

iEMS Solutions

Management Level

Carbon & Energy
Management



iEMS/ECOEnterprise

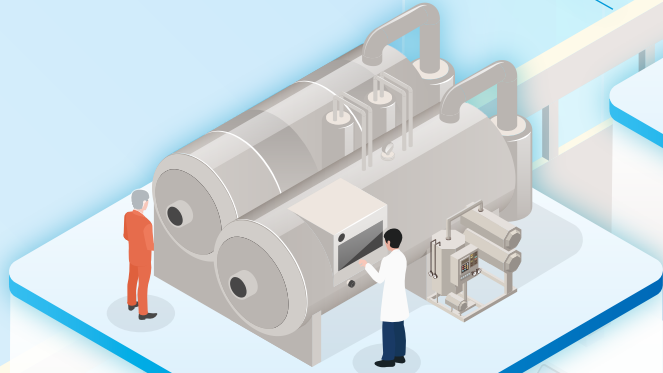
Examine corporate carbon asset management, automated carbon inventory, energy-saving transformation strategies, and green energy strategies from the perspective of the management, helping corporate carbon asset self-management, achieving ISO14064/ISO14067, energy conservation, carbon reduction, and green energy management, and then achieving carbon neutrality goals.



iEMS/ECOWatch

Monitors energy consumption of water, electricity, gas, renewable energy. Statistical analysis, demand and allocation management, automatic energy declaration and compliance with ISO50001, etc., Assist enterprises in completing digital energy transformation and achieving energy conservation and emission reduction.

Operations Department



HVAC



PHM



FACTORY



Compressor

Operational Level
Energy Saving & Equipment
Efficiency Management



iEMS/HVAC

Energy-saving control and predictive maintenance, realize the intelligent management and control of the whole process.



iEMS/Compressor

The perfect combination of centralized control and information processing of the compressors system. Energy-saving control and predictive maintenance can be realized, thereby improving the management efficiency of the entire compressed air system.



iEMS/PHM

Detect the abnormality or degradation of motor equipment, grasp the status of equipment, improve the management and maintenance efficiency of rotating mechanical motor equipment, increase the service life of equipment and reduce life cycle operating costs.

Advantech Develops a Net-Zero Ecosystem to Support Enterprises in Embracing the ESG Trend

Photo provided by Advantech
Interview with Veronica Lin, Director of WISE-iEMS of Advantech

As the importance of the issue of environmental sustainability continues to heat up, enterprises are incorporating environmental, social, and governance (ESG) principles into their operations as a fundamental element for long-term success. Carbon reduction and development of net-zero goals in particular are critical actions that companies must take to achieve sustainability. In line with this, Advantech has partnered with various stakeholders, including system integrators, carbon inventory consultants, energy services companies (ESCOs), energy storage and renewable energy services, renewable energy carbon credit suppliers, and certification service agencies. Together, they have created a sustainable ecosystem to deliver comprehensive solutions and services that assist enterprises worldwide in promoting carbon reduction and achieving net-zero emissions.



ESG, net zero, and carbon neutrality as global trends

Veronica Lin, Director of Advantech's WISE-iEMS, emphasized that ESG, net zero, and carbon neutrality have become global trends, receiving significant attention from governments, businesses, and individuals. On the policy front, many countries worldwide, including the United States, Japan, South Korea, and Taiwan, have committed to achieving net-zero emissions by 2050. In total, 137 countries have joined this initiative. Additionally, initiatives like the European Union's Carbon Border Adjustment Mechanism (CBAM) and the enactment of carbon neutrality legislation by 14 countries have sparked a wave of carbon reduction efforts.

In the tech industry, international manufacturing brands such as Apple, Google, and Sony have pledged to contribute to achieving net-zero emissions. They are improving energy efficiency, adopting low-carbon design practices, and establishing sustainable supply chains. For example, Apple aims to achieve carbon neutrality across its entire business, supply chain, and product life cycle by 2030, while Sony has incorporated carbon neutrality goals into its

supply chain management to be achieved by 2040. Consumer awareness of environmental protection has increased, with people showing a preference for environmentally friendly brands and products.

Ms. Lin emphasized that the global pursuit of sustainability has commenced, with ESG, net zero, and carbon neutrality serving as key directions for business operations. Carbon inventory and asset management, effective energy management and utilization, comprehensive energy-saving measures through hardware and software solutions, and increased adoption of clean energy sources are all vital for reducing carbon emissions. Advantech's WISE-iEMS Intelligent Energy Management Solution, which integrates hardware, software, and IoT cloud platforms, enables global businesses and industries to efficiently pursue their ESG, net zero, and carbon neutrality goals.

Comprehensive WISE-iEMS system

The WISE-iEMS solution offers a comprehensive approach to carbon reduction, covering three areas: carbon inventory and asset management (automatic generation of ISO 14064/14067 and greenhouse gas inventory reports), energy management (review of reports for ISO 50001 / energy declarations / energy-saving project management and benefit confirmation), and improvement and management of key energy-consuming equipment.

The WISE-iEMS system encompasses six major solutions for enterprises, including "ECOEnterprise" for carbon asset and inventory management, "ECOWatch" for energy management, "HVAC" for heating, ventilation,

“Advantech’s WISE-iEMS Intelligent Energy Management Solution, which integrates hardware, software, and IoT cloud platforms, enables global businesses and industries to efficiently pursue their ESG, net-zero, and carbon neutrality goals.”

***- Veronica Lin,
Director of
WISE-iEMS at
Advantech***



and air conditioning energy efficiency management, "Compressor" for air compressor energy efficiency management, "PHM" for rotating machinery motor efficiency management, and "Water" for water resource energy efficiency management. These solutions empower enterprises to implement comprehensive carbon reduction strategies.

Advantech's WISE-iEMS has already successfully implemented the plan with 12 of the company's office buildings and factories located at its headquarters in Taiwan and overseas branches. This system enables effective management and performance improvement of carbon emissions, energy consumption, and critical energy-consuming facilities. By utilizing the system to collect data from various countries and consolidate it for centralized management at the headquarters, Advantech achieves

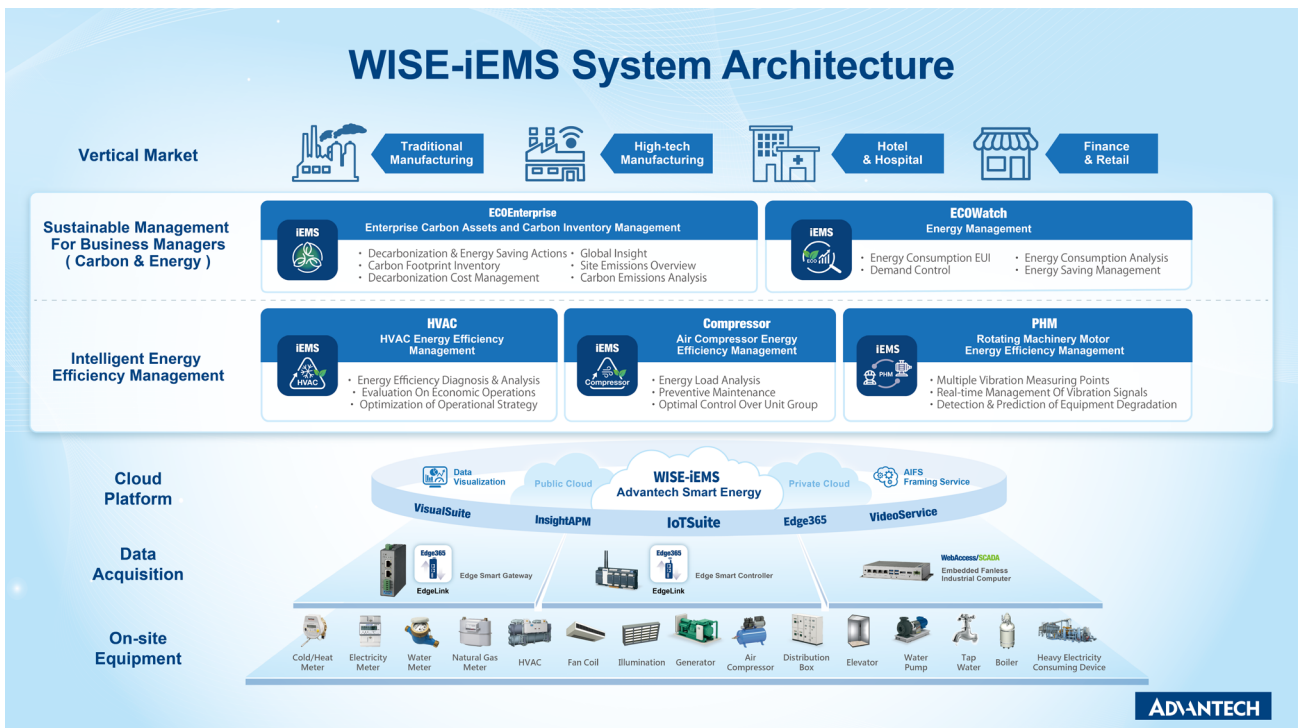
continuous optimization of energy management, ultimately working toward the goal of carbon neutrality. Currently, WISE-iEMS is also being utilized in various industries, such as electronics, textiles, steel, petrochemical, paper, hospitals, hotels, retail, and finance. It has become a trusted partner for corporate ESG, net-zero, and carbon neutrality initiatives.

Establishing a net-zero ecosystem through collaboration

Ms. Lin emphasized that while Advantech’s WISE-iEMS system can help enterprises optimize their energy management and energy conservation efforts, they must devise a more comprehensive sustainable development blueprint to achieve net-zero emission goals. To deliver more comprehensive services, Advantech has partnered with carbon inventory and certification consulting service companies, as well as ISO certification agencies. This collaboration enables

Advantech to offer diagnostic and sustainable planning consulting services to enterprises from the initial stages of their carbon reduction plans. Concurrently, to effectively handle existing on-site energy consumption equipment during the implementation of the WISE-iEMS system, Advantech has teamed up with ESCOs to help design energy-saving improvement plans based on the enterprise’s specific on-site environment and equipment status.

In conclusion, Ms. Lin emphasized that Advantech is committed to creating a sustainable ecosystem that covers all stages of carbon reduction, assisting more enterprises in their journey to achieving net-zero emissions. Furthermore, Advantech will continue to lead by example and accelerate its own net-zero transformation mission, embracing their mission of enabling an intelligent planet. ■



iEMS/ECOWatch: Digitalization & Transformation of Energy Management

Achieving Multiple Energy Management, ISO 50001, & Auto Energy Reporting



ECOWatch



Multiple Energy Usages & Resources Management

Avoid Resource Risks & Maintenance Costs

Energy Saving Plan Management

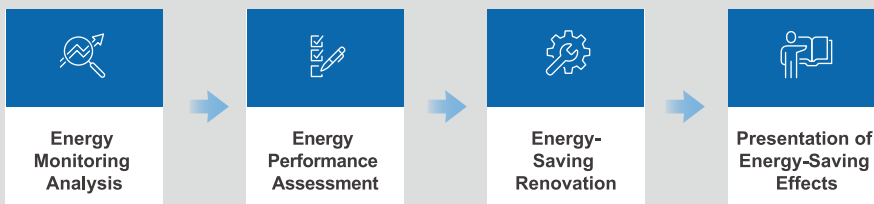
Energy Report Generation



Enabling an Intelligent Planet

Monitors energy consumption of water, electricity, gas, etc., Statistical comparison, demand and allocation management, automatic energy declaration and compliance with ISO50001, etc., Assisting enterprises to complete energy digital transformation and achieve energy conservation and emission reduction.

- ✓ **Fast Installation**
- ✓ **Automatic Data Acquisition**
- ✓ **Multiple Views of Energy Diagnosis**
- ✓ **KPI & Energy Efficiency Tracking**



Explore
iEMS/ECOWatch

EY Joins Forces with Advantech to Pursue Environmental Sustainability

Photo provided by EY
Interview with Brian Lin, Vice President of ESG Strategy and Sustainability Services, EY



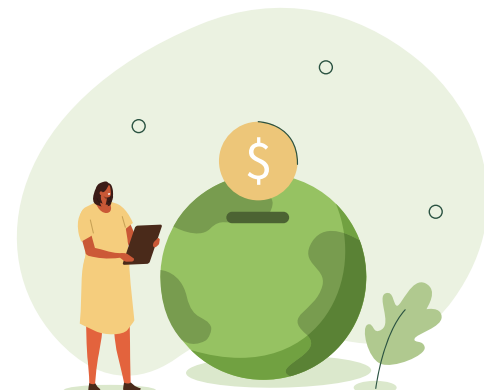
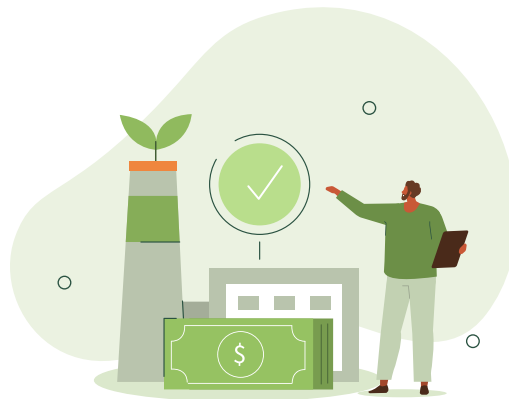
In 2021, the US state of Texas was hit hard by winter storms, causing power outages for four million households which resulted in food shortages. Meanwhile, several cities in China experienced severe disasters in 2022 such as river flooding and landslides due to heavy rainfall, also resulting in significant hardship for local residents. Events like these have been occurring more frequently in recent years and are closely related to climate change.

Brian Lin, Vice President of ESG Strategy and Sustainability Services at EY, pointed out that, “The issue of carbon reduction has received greater attention from governments around the world as they attempt to prevent more natural disasters from happening. In order to push ahead with carbon reduction, many countries have gradually moved from advisory guidelines to laws

and regulations that strictly mandate carbon reduction. Indeed, related bills continue to be passed in rapid succession, which will accelerate the pace of carbon reduction.”

New era of carbon pricing and market mechanisms

“In the near future, the era of carbon pricing and related market mechanisms will officially arrive,” emphasized Lin. Once governments start imposing carbon taxes or establishing carbon trading mechanisms, all enterprises, regardless if they are large corporations or SMEs, will have to address carbon emissions seriously. They will need to implement concrete carbon reduction measures, taking into consideration cost control, supply chain management, and financing.



Ambitious legislation introduced worldwide

“To accelerate the pace of carbon reduction in enterprises, both the carrot and the stick are needed,” said Lin. To encourage active energy-savings and carbon-reduction efforts by the private sector, international organizations and governments around the world are implementing regulatory and incentive-based laws. In addition to the European Union’s pioneering Carbon Border Adjustment Mechanism (CBAM), which will gradually impose carbon taxes starting from 2023, governments of various countries are also working to implement carbon reduction measures through sustainable tax measures.

For example, the United States introduced the Clean Competition Act (CCA) in June 2022, based on carbon tax calculations which will start to be levied in 2024. The scope of taxation includes domestically manufactured products in the United States as well as imports from other countries, with conditions that may be even stricter than the CBAM. Taiwan has set a schedule for greenhouse gas inventory and verification for listed companies and has established measures to implement carbon pricing starting in 2023. Carbon tax collection will be implemented first, followed later by a carbon trading mechanism.

Meeting carbon goals for supply chain and bank financing requirements

Besides adhering to legal statutes and regulations, businesses must also address customer expectations and financing criteria concerning carbon emission reductions. Lin stated that international brands such as Apple, Google, Microsoft, and Nike have set carbon emission requirements

“The collaboration between EY and Advantech will assist more companies in achieving carbon reduction goals and together realizing the vision for a net-zero planet.”

- Brian Lin, Vice President of ESG Strategy and Sustainability Services at EY



for their supply chain partners. Meanwhile, banks must evaluate the carbon reduction capabilities of companies applying for loans as one of their assessment criteria. This means that in the future, the responsibility for carbon reduction based on ESG principles will extend beyond just large corporations. Numerous small and medium-sized enterprises (SMEs) that provide essential components and raw materials to prominent brands and rely on frequent financial support will find it vital to actively engage with the carbon reduction agenda rather than remaining indifferent towards it.

Because SMEs have limited capital and cannot implement smart solutions related to carbon reduction, Mr. Lin proposed that SMEs could begin by choosing a pilot location to apply ISO standards. Furthermore, they could opt for a subscription-based approach to incorporate smart management systems for monitoring carbon emissions. By doing so, SMEs can equip themselves with sufficient knowledge and capabilities when carbon reduction regulations are implemented, as well as gain an appreciation for the benefits

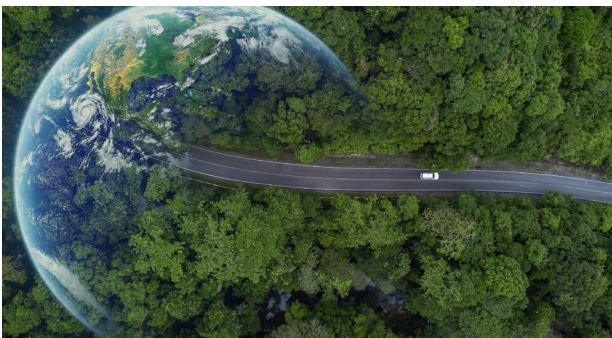
of carbon reductions within the company. In addition, well-known brand manufacturers will be more likely to work with suppliers who meet carbon neutrality targets.

Collaboration with Advantech reinforces EY's ESG ecosystem

To assist industries in implementing carbon reduction, EY has specifically constructed an ESG platform that connects various resources, inviting Advantech to join as a smart technology partner. At the same time, EY has become integrated into Advantech's sustainable ecosystem, assuming a crucial role in advisory and consulting.

"Advantech and EY have complementary advantages," stated Lin. Advantech provides smart solutions, possesses abundant technical resources, industry knowledge, and practical experience and assists many enterprises with IoT applications, energy conservation, and carbon reduction. Meanwhile, EY's wide-ranging expertise in advisory services helps enterprises comply with regulations and implement carbon-related ISO standards. The collaboration between the two companies will enhance the energy conservation and carbon reduction plans of both enterprises.

For example, in the future, before adopting



intelligent energy management system solutions, Advantech's customers can utilize EY's advisory and consulting services to proactively develop comprehensive carbon reduction plans. Conversely, if companies wish to adopt the ISO 14067 carbon footprint standard, they can utilize Advantech's carbon inventory system to instantly calculate the carbon footprint generated by their product or service, thereby improving the efficiency and integrity of calculations.

"This collaboration with Advantech will transform EY from being a consultant providing one-time advisory services to becoming a provider of long-term carbon reduction planning," explained Lin. In the future, enterprises can grant EY access to their smart systems, allowing their experts to provide daily, weekly, or monthly recommendations based on compliance, supply chain trends, changes in financing conditions, and other aspects. Such assistance will help optimize the calculation of carbon emissions at different stages of the product lifecycle and facilitate improved communication with internal and external units involved in carbon reduction.

Currently, the collaboration between EY and Advantech is in its early stages, and both parties are actively gauging interest among companies within their existing client bases. They aim to provide comprehensive solutions ranging from consulting services to system integration. Once successful cases emerge, both parties will further integrate their resources to replicate Taiwan's successful experiences and export them to the global market. This will assist more companies in achieving carbon reduction goals and realize the global vision of a net-zero planet. ■

iEMS/HVAC: Optimize HVAC System Performance

Achieving HVAC System Management & Energy Efficiency



HVAC System Overview



AI HVAC System Operation Optimization



Real-Time Monitoring & Abnormal Alarm



System Operation & Efficiency Analysis



HVAC



Avoid Malfunction With Real-time Monitoring



Stave Off Costly Repairs With Preventive Maintenance



Optimize System Performance with Smart HVAC System Control



Reduce Energy Waste

ADVANTECH

Enabling an Intelligent Planet

Collect operating parameters and provide optimization strategies for energy savings in HVAC systems.

Value: Save energy, reduce energy consumption and improve equipment quality and efficiency

- The air-conditioning rooms are **with few staff on duty**.

The system's **overall energy Consumption** can be reduced by

5%~50%

Equipment **health** can be increased by around

10%~20%

The organization's **operation efficiency** can be increased by

10%~30%

The three-level-benefit approach:

Level 1

Build a digital twin energy station and realize intelligent management.

Level 2

The system operates highly efficiently and realizes the goal of saving 5% to 10% of energy.

Level 3

Facilitate equipment renovation and reach the goal of saving 20% to 50% of system energy overall.

- ✓ Automatic Real-Time Monitoring
 - ✓ System Operation Control
 - ✓ Operating Parameter Settings & Monitoring
 - ✓ Alarm With E-mail & Mobile Notifications
- Chillers • Cooling Tower • Pumps
-

Explore iEMS/HVAC

Vishay Leverages Advantech's WISE-iEMS for Energy Management Solutions across Asia-Pacific



Photos provided by Vishay

Interview with Hai Tsai, Asia-Pacific's Senior Director of IEHS Vishay Semiconductor

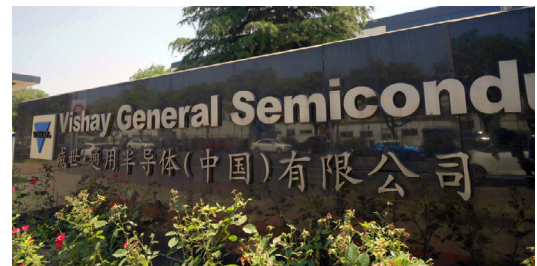
With the growing influence of Environmental, Social, and Governance (ESG) initiatives, all industries are actively advocating for energy conservation and carbon reduction strategies with the goal of reducing energy consumption and carbon emissions. This collective effort contributes to global sustainability. Vishay Group, the world's largest manufacturer of discrete semiconductors and passive electronic components, plans to gradually deploy Advantech's WISE-iEMS intelligent energy management solution in 15 factories throughout the Asia-Pacific region. Vishay Group is striving to achieve its carbon emission reduction goals by centralizing equipment monitoring, energy management, and maintenance into a unified platform. They are integrating energy-related data from various facilities to enhance overall energy efficiency through centralized management.

Real-time energy management data reporting in semiconductor facilities

Vishay Semiconductor Asia-Pacific's Senior Director of IEHS, Hai Tsai, emphasized that Vishay Group acknowledged the significance of energy management early on, incorporating energy management systems in several of its factories. While these systems automatically gathered and analyzed energy source data to aid in the development of energy conservation and emission reduction strategies and goals, they lacked real-time

data. Energy usage information was still aggregated periodically, and all comparisons, analyses, and reviews occurred days, weeks, or even months later. As a result, any energy strategies implemented yielded suboptimal results due to the extended processing time.

“For a semiconductor factory that operates 24/7 all year round, the key to minimizing energy waste and carbon emissions while lowering production costs lies in tracking energy consumption and promptly identifying anomalies,” said Mr. Tsai. To achieve this objective, Vishay Group implemented Advantech's WISE-iEMS intelligent energy management system. Initially, the system will be deployed in factories in Xi'an, Tianjin, Huizhou, and Kaohsiung. Currently, it has been successfully implemented in Xi'an with tangible results.





Vishay Group implemented Advantech's WISE-iEMS intelligent energy management system. Initially, the system will be deployed in factories in Xi'an, Tianjin, Huizhou, and Kaohsiung. Currently, it has been successfully implemented in Xi'an with tangible results.



- Hai Tsai, Asia-Pacific's Senior Director of IEHS Vishay Semiconductor



Case Study Benefits

1. Improved equipment efficiency and resource utilization.
 2. Reduced production costs and human resources.
 3. Decreased equipment maintenance costs and equipment failure rates.
-

Smart management yields two improvements and four reductions

Vishay's Xi'an plant primarily engages in the packaging and production of components, such as diodes and MOSFETs. It spans a vast area, making equipment and energy usage management a colossal task for subpar systems. Presently, by employing iEMS/ECOWatch and the facility management control system (FMCS) for equipment management and control paired with data acquisition, real-time monitoring, analysis, and comprehensive diagnostics, the system has already yielded benefits on three fronts:

First, real-time reporting of equipment energy consumption, carbon emissions statistics, and energy management KPI calculations has significantly improved energy management efficiency in the factory. "Once iEMS/ECOWatch is implemented in each plant, Vishay can compare factories horizontally and continuously identify areas for improvement," emphasized Mr. Tsai. In line with ESG trends, Vishay's supply chain has strong demands regarding carbon reduction strategies, and WISE-iEMS/ECOWatch can aid in ensuring those demands are met with minimal effort.

Second, being able to monitor plant equipment and calculate equipment operation efficiency indices based on actual energy consumption and equipment utilization rates means the factory can gauge equipment wear and tear and plan for maintenance accordingly. This avoids unnecessary energy loss from outdated equipment while enhancing the plant's efficiency.

Third, it boosts work efficiency and reduces time and human resource demands. Mr. Tsai further explained that previously, data had to be extracted and compiled from monthly or annual financial reports, but WISE-iEMS makes it possible to easily present energy management information to customers. It can also automatically gather data and generate reports, considerably reducing time and human resource costs for customer audits.

Overall, the implementation of WISE-iEMS at the Xi'an plant has led to two improvements and four reductions. These include notable enhancements in equipment efficiency and resource utilization, as well as reductions in production costs, equipment maintenance expenses, equipment failure rates, and the demand for human resources.

Two key reasons for choosing Advantech as a sustainable partner

Despite the many energy management solutions in the market, Vishay selected Advantech for two critical reasons:

First, Advantech's system architecture combines both on-site deployment and cloud integration. Mr. Tsai noted that many energy management solutions from other international companies are primarily cloud-based with no on-site deployment options. However, Advantech's WISE-IoT platform can be deployed locally with the option to centrally store data on a private cloud.

Second, Advantech's WISE-iEMS provides a low-code design with high flexibility, offering standard products and additional custom system development services. Mr. Tsai underscored that energy management is not static, and KPIs may shift based on operational status, external factors, and the group's energy conservation goals. Furthermore, Vishay has unique internal systems, making it necessary for them to adjust and customize the energy management system for various reasons.

Nevertheless, most international brands' software development centers are situated in Europe or the United States, causing communication delays and potentially high costs if development is needed. By contrast, Advantech's engineering team provides local support, and their customer-centric approach enables engineers to proactively assist in resolving system implementation challenges, particularly during customization.

Looking ahead, Vishay will continue to deepen its partnership with Advantech, further promoting the implementation of energy management systems in its Asia-Pacific factories. The group will also explore other smart applications for WISE-iEMS, such as adopting the Computerized Maintenance Management System (CMMS) for facility preventive maintenance or utilizing carbon asset inventory services to streamline sustainable reporting operations.

"Advantech and Vishay share a common commitment to sustainability goals for our planet, and both companies are actively involved in promoting ESG," remarked Mr. Tsai. He is confident that with a shared vision, collaboration between the two companies will contribute significantly to optimizing Vishay Group's energy utilization efficiency by reducing carbon emissions and production costs while ensuring sustainable business operations and environmental sustainability—creating a situation of mutual benefit for Advantech, Vishay, and the planet. ■



WISE-iEMS Facilitates Energy Conservation and Carbon Reduction Goals for YC Group



炎洲集團
YC GROUP

Photos provided by YC Group

Interview with Bai-Xiang Cheng, General Coordinator and Project Manager of the Energy Conservation and Carbon Reduction Team of YC Group

Aiming for environmentally responsible strategies, YC Group, the renowned manufacturer of PVC and oriented polypropylene (OPP) tapes, is driving change across four key domains: corporate governance, talent cultivation, operational transformation, and energy conservation and carbon reduction. This commitment is underpinned by a focus on a people-centric corporate culture while proactively advocating for environmental sustainability.

Bai-Xiang Cheng, General Coordinator and Project Manager of the Energy Conservation and Carbon Reduction Team at YC Group, stated that since its establishment in 1978, YC Group has been involved in diverse sectors, including film, tape, and packaging production, and

the company has consistently upheld high standards for environmental sustainability. Beyond actively reducing the production of volatile organic compounds (VOCs), the company reinforces the circular economy concept, emphasizing the recycling and reuse of solvents, while giving substantial importance to energy conservation and carbon reduction.

As YC Group takes the lead in carbon reduction efforts, they recognized the need for monitoring the real-time energy usage status of their factories across Taiwan, China, the United States, Southeast Asia, and other regions, which was essential to maximizing energy conservation and carbon reduction effectiveness. This would play a crucial role in information integration and identification of optimal energy strategies, furthering their carbon reduction targets. To fulfill this need they turned to Advantech's WISE-iEMS, a comprehensive energy management solution, which helped realize the group's requirements.

Establishing a global energy management platform

During the latter part of 2022, YC Group embarked on the process of implementing the ISO 50001 energy management system standard at their no. 2 plant in Yangmei District and film plant no. 2 in Changhua Coastal Industrial Park. Consequently, the company was able to implement a new energy management platform beginning with these two plants. Mr. Cheng noted that



the project team spent six months evaluating five system platforms and ultimately chose Advantech's WISE-iEMS solution for four reasons:

Comprehensive equipment monitoring: The iEMS/ECOWatch energy management solution permits centralized monitoring of various energy-intensive equipment like air conditioning, air compressors, and boilers, offering real-time insights into energy consumption and flow.

ISO 50001 compliance: The solution provides a visual dashboard in compliance with ISO 50001 performance indicators, enabling decision-makers, administrators, and frontline staff to quickly access information and streamline operational execution. For example, setting energy baselines for benchmarking actual energy consumption can aid in identifying equipment or facilities with excessive energy consumption.

Global scalability: Advantech's platform is highly scalable and supports multiple languages, allowing YC Group's employees in global factories to easily connect and utilize its functions.

Global support services: Advantech, along with its partners, can offer on-site support services worldwide, empowering YC Group to maintain a unified energy management platform for real-time monitoring and optimization of equipment energy consumption.

Mr. Cheng underscored that iEMS/ECOWatch not only centralizes the energy management of various plants, but also meets the essential requirements of energy management via its embedded analytics modules and dashboard functionalities. This considerably shortens the time required for custom application development and system deployment.

"Implementing an energy management system not only enhances the benefits of energy conservation and carbon reduction but also optimizes operational costs and increases YC Group's competitiveness in the global market," stated Mr. Cheng. In 2022, the Ministry of Economic Affairs increased

the average industrial electricity price by 15%, with an additional 17% increase planned for 2023. Considering the two-year increase in electricity costs, YC Group's monthly electricity expenditure will increase by at least NTD\$7 million. Thus, having an energy management platform to monitor electricity consumption and identify energy-saving methods significantly assists in reducing operating costs.

Progress towards sustainable environmental conservation

Advancing smart energy management is a gradual endeavor, and YC Group's initial plan focuses on the deployment and optimization of the iEMS/ECOWatch system for plant No. 2 in Yangmei District and the film plant in Changhua Coastal Industrial Park in 2023. Once successful strategies are established in Taiwan, the group is considering a rollout of the system in various plants across China, and subsequently expanding that to facilities in the United States and Southeast Asia. Over time, the aim is to achieve a comprehensive global energy management framework and progressively fulfill YC Group's mission for promoting environmental sustainability.

Beyond their energy conservation endeavors, YC Group is also investigating applications related to carbon emissions. Mr. Cheng mentioned that in addition to actively complying with Taiwan's Climate Change Response Act, they attach substantial importance to greenhouse gas



Implementing an energy management system not only amplifies the benefits of energy conservation and carbon reduction but also optimizes operational costs leading to an improved competitive edge for YC Group in the global market.



- Bai-Xiang Cheng, General Coordinator and Project Manager of the Energy Conservation and Carbon Reduction Team at YC Group



Case Study Benefits

1. Centralized management of energy status across various plants.
2. Optimization of the group's operational costs.
3. Achieving the company's mission of promoting environmental sustainability.

inventories as more than 80% of the group's products are exported to international markets. Following the Financial Supervisory Commission's release of sustainable development guidelines for listed companies, the assessment of greenhouse gas inventories is underway across various plants. Furthermore, spurred on by the Ministry of Environment's expansion of businesses subject to greenhouse gas emission registration in August 2022, manufacturing industries with annual greenhouse gas emissions exceeding 25,000 metric tons of carbon dioxide equivalent (CO₂e), encompassing both direct emissions (resulting from fossil fuel combustion) and indirect emissions (arising from electricity usage), are now mandated to register and undergo assessment. This year, the Yangmei plant is actively undertaking the task of compiling and subsequently verifying its greenhouse gas inventory. Moving forward, they will further explore carbon pricing and carbon tax regulations in Taiwan and other countries to ensure their products remain competitive. Looking to the future, YC Group envisions continued utilization of Advantech's solutions to achieve successful outcomes in their carbon reduction efforts.

"Energy management is our first collaboration with Advantech, and during the collaboration process, we have seen that Advantech offers suitable services in many domains. We anticipate numerous opportunities for further collaboration in the future," stated Cheng, citing smart factories as an example. Currently, YC Group has already evaluated the implementation of the manufacturing execution system (MES), marking their first step in building smart factories. They will also require automation and IoT solutions to optimize production and management within their plants. It is expected that they will collaborate with more service providers, including Advantech, to boost their competitiveness while fostering sustainable long-term environmental protection strategies. ■

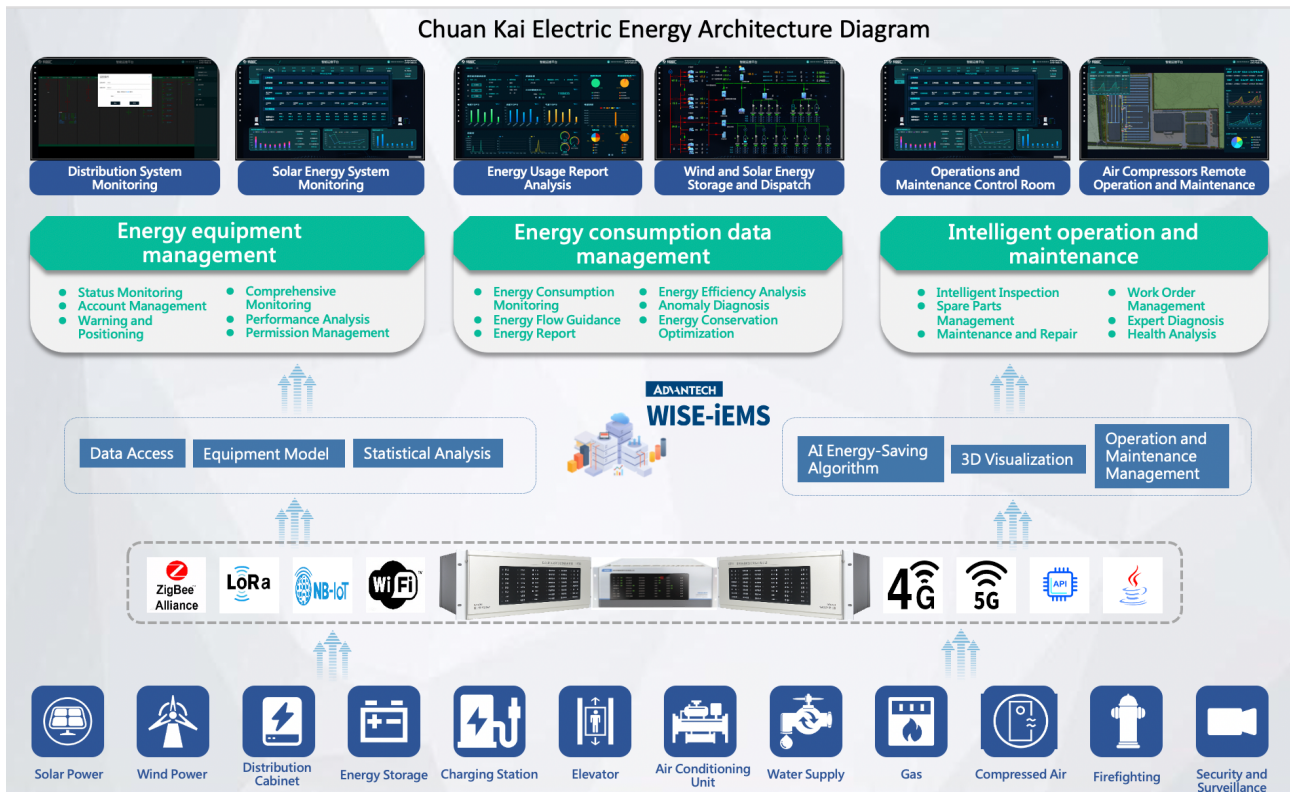
Advantech WISE-iEMS Assists Chuan Kai Electric to Move Toward Smart Energy

Photos provided by Chuan Kai Electric
 Interview with Shi-Xu Liu, President of the Smart Energy Research Institute of Chuan Kai Electric



Power transmission and distribution systems play a crucial role in the generation of energy, making the power industry essential for realizing sustainable, low-carbon growth and deploying intelligent energy solutions across various sectors. As a leading company in China's power transmission and distribution sector, Chuan Kai Electric Co., Ltd. provides full engineering, procurement, construction, and operation services for power transmission and distribution to over 1,300 Chinese enterprises

across diverse fields, including power grids, aerospace, military, nuclear power, communications, industrial parks, and commercial buildings. This article highlights Chuan Kai Electric's leadership in the development of smart energy systems, with far-reaching implications for driving zero-carbon development in China.



Green transformation strategy in pursuing low-carbon sustainability

With sustainability as a core value, Chuan Kai Electric has established a new round of transformational strategies in response to the Chinese government's 3060 national decarbonization strategy. This strategy aims to reach peak carbon emissions by 2030 and achieve carbon neutrality by 2060. As a long-standing partner of Chuan Kai Electric in promoting digitalization and intelligentization, Advantech is the ideal partner for their transformation program.

According to Mr. Shi-Xu Liu, President of the Smart Energy Research Institute at Chuan Kai Electric, China's power transmission and distribution industry is still not fully aware of the importance of pursuing low-carbon emissions. Moreover, significant barriers to the integration of smart features into power distribution equipment include the financial burden of adopting intelligent transmission and distribution solutions, as well as the cautious approach adopted by numerous businesses toward embracing IoT applications like smart energy management systems, which are tailored to meet carbon reduction goals. As a result, most of Chuan Kai Electric's customers continue to rely on fundamental power equipment.

In their green transformation blueprint, Chuan Kai Electric has devised a two-pronged approach to persuade customers to embrace smart energy

management. The first approach is through smart distribution, which relies on Advantech's IoT platform and development tools to accelerate the development of safe, efficient, low-carbon solutions. This helps reduce the cost associated with adopting smart distribution equipment, thereby boosting customer willingness to adopt smart energy management applications. The second approach is through the adoption of low-carbon energy strategies, as exemplified by the implementation of Advantech's WISE-iEMS Smart Energy Management Solution in Chuan Kai Electric's Chengdu production park. This low-carbon park serves as a model for other industries pursuing low-carbon objectives and is helping more enterprises witness for themselves the benefits of adopting smart energy management solutions.

WISE-iEMS improves the energy management of a large-scale park

Chuan Kai Electric's low-carbon park has already yielded concrete results. Mr. Liu explained that the park covers an area of 20 hectares. To reduce carbon emissions across the park, solar energy is used as the main source of low-carbon energy. With an installed solar capacity of up to 1.72 MW, the park can generate 5,500 kWh of electricity per day during peak hours, accounting for approximately 20% of the factory's total electricity consumption. The efficient utilization of solar power generation results in significant carbon reduction benefits.

Furthermore, the production base features a range of energy-consuming equipment such as air conditioners and real-time monitoring of energy usage across the park enables the creation of optimal energy-saving strategies including the reduction of abnormal electricity consumption. This approach aids energy conservation and carbon reduction and to reach it, Chuan Kai Electric constructed a microgrid system and implemented

Advantech's WISE-iEMS system to deliver smart energy management across the entire park. This smart energy management platform integrates all power generation and usage data and optimizes solar power and energy-consumption equipment throughout the park.

The WISE-iEMS system offers a user-friendly interface for managing solar power generation, presenting clear and up-to-date information to park administrators. They can easily access daily and monthly electricity generation data and compare the current day or month's power generation status with the previous day or month, allowing for better planning and utilization of the solar power system, ultimately resulting in reduced carbon emissions and costs.

WISE-iEMS also enables the monitoring of energy consumption data for all park equipment. This means that administrators can quickly and accurately query the energy consumption of various equipment quickly by selecting options such as the park region, organization, equipment, and load type, which then allows them to formulate corresponding energy performance management measures that align with the park's energy conservation goals. Furthermore, if an abnormality is detected in any equipment, WISE-iEMS sends out an early alert to relevant personnel to resolve the issue quickly and avoid any unnecessary waste of energy.

Mr. Liu acknowledged that Advantech shows its commitment to reducing industrial carbon emissions by offering the latest and most practical solutions and products. Advantech has helped Chuan Kai Electric achieve comprehensive digital transformation, and WISE-iEMS has played an essential part in helping the company manage energy throughout the entire park, thus helping Chuan Kai Electric demonstrate its commitment to sustainability and achieving zero carbon emissions. ■



Case Study Benefits

1. Enables accurate planning and utilization of the solar power system.
2. Reduces carbon emissions and electricity costs.
3. Realizes the goals of energy conservation and consumption reduction.

Joining Forces with Globally Renowned Partners to Co-Create ESG Net-Zero Sustainable Solutions

In response to global ESG trends, Advantech is committed to its vision of “Enabling an Intelligent and Sustainable Planet.” To realize this vision, the company has collaborated with ESG carbon inventory/planning consulting firms, energy service companies (ESCOs), system integrators, renewable energy companies, green energy/carbon credit suppliers, certification agencies, and other carbon reduction-related entities to build the Advantech Sustainable Ecosystem. Currently, Advantech offers comprehensive carbon-centric solutions for enterprises by connecting with ecosystem partners such as PwC, Junyuan Energytech, Chur, and Net Zero Carbon Offset. Together with these partners and clients, Advantech aims to realize a future of net-zero emissions.



Consulting Services: PwC Taiwan

Interview with Chia- Hung Chang, Partner/Managing Director of Sustainability & Climate Change of PwC Taiwan



As the global consensus gravitates toward net-zero emissions, the measure of business competitiveness has shifted from emphasizing earnings per share (EPS) to promoting sustainable operations through Environmental, Social, and Governance (ESG) initiatives. Chia-Hung Chang, Partner/Managing Director of Sustainability & Climate Change of PwC Taiwan, highlighted that companies neglecting ESG could encounter fewer orders, lower funding, and a talent shortage in the future. Given the profound impact ESG will have on sustainable operations, businesses must approach this issue prudently.

A 3-step strategy to realize carbon reduction

Responding to the carbon reduction trend, Mr. Chang suggested that businesses follow these three steps:

Step 1: Execute a complete carbon inventory – Businesses should conduct a greenhouse gas inventory of indirect emissions across the entire value chain to fully comprehend their carbon emissions, or “Scope 3 emissions,” accounting for 65–95% of a business’s total emissions.

Step 2: Outline a carbon reduction pathway – Companies can utilize carbon emission data as a benchmark to establish carbon reduction plans. Effective carbon governance frameworks should start from the board level, using a top-down approach to set visions and goals that align with future operational development strategies.

Step 3: Develop a carbon reduction strategy – To create a comprehensive transformation plan, businesses should adopt an “inside-out” approach, beginning with integration and communication across all departments. Starting from senior management, businesses must develop department-level assessment and incentive systems for carbon reduction performance. Concurrently, adopting an “outside-in” perspective is necessary to grasp industry trends, understand the practices of leading global companies, and scrutinize pertinent reduction technologies, methods, and cost calculations.

Optimizing carbon reduction strategies via carbon inventory and procedure planning

PwC offers various services to assist enterprises with their carbon reduction strategies, including ISO carbon inventory/footprints, science-based targets (SBTs), pathway planning, and more. Recognizing that manual inventory processes are inefficient and prone to error, PwC also provides relevant digital technology solutions. With Advantech’s Intelligent Energy Management System (iEMS) integrated into PwC’s service offerings, businesses can access real-time monitoring and analysis of energy consumption equipment for more informed decision-making. Through ongoing collaboration, both Advantech and PwC can provide additional comprehensive solutions to help businesses in their efforts to reduce carbon emissions. ■

ESCO: Jun Yuan Energytech Eng.

Interview with Hong Yao Zhao, Chairman of Jun Yuan Energytech ENG



As the EU, the US, and various other nations implement carbon tax regulations, the conversation about decreasing carbon emissions is gaining momentum. While businesses are becoming increasingly aware of the need for carbon reduction initiatives, their hesitance stems from the ambiguity surrounding upcoming frameworks for collecting carbon taxes and establishing carbon trading platforms. Despite acknowledging the importance of carbon reduction, this uncertainty is causing indecision among businesses. Hong Yao Zhao, Chairman of Jun Yuan Energytech Eng., emphasized that while buying carbon credits can help mitigate carbon footprints, the ultimate solution doesn't involve trying to forecast future carbon prices. Instead, it rests on implementing strong and consistent initiatives for reducing carbon emissions.

Collaborating with Advantech to create field-adapted smart applications

Since its founding in 2007, Jun Yuan Energytech Engineering has remained dedicated to offering extensive services encompassing refrigeration and air conditioning, energy technology, energy conservation, and engineering. Over the past five years alone, the company has successfully completed over 500 industrial projects. Whether engaged in new constructions, renovations, or improvements to existing structures, their primary emphasis revolves around integrating impactful energy-saving designs and equipment.

In the past, initiatives within corporate buildings aimed at reducing carbon emissions often began by upgrading to more energy-efficient equipment. Certain businesses also integrated energy monitoring and management systems. However, the utilization of intelligent energy-saving applications across entire buildings or factories was limited. Now, with growing emphasis on carbon reduction, investment in such solutions is set to rise, especially with growing urgency for energy efficiency in manufacturing.

"Enterprises often face talent shortages, limited funds, and uncertainty over where to begin implementing smart energy-saving systems," highlighted Mr. Zhao. Through the utilization of Advantech's sustainable ecosystem, Jun Yuan has utilized their proficiency in electromechanical engineering and energy-saving design to assist businesses in overcoming these transitional obstacles. Drawing upon their extensive industry knowledge, they are well equipped to implement Advantech's iEMS solutions across a broader range of factories and buildings."

According to Mr. Zhao, collaborating with Advantech could potentially result in practical demonstrations that aim to discover and highlight the synergies between Jun Yuan and Advantech. This effort will also involve the discovery of pioneering services and solutions that can yield even more significant energy-saving advantages, ultimately making a more substantial contribution to global sustainability. ■

System Integrator: Chur Co., Ltd.

Interview with Jack Liao, General Manager of Chur



Catering to ESG trends, Taiwanese enterprises must accelerate their pace and initiate energy-saving and carbon-reduction plans to maintain their competitiveness. “Regardless of the reasons why a company needs to reduce carbon emissions, the first step is always measurement,” said Jack Liao, General Manager of Chur. He describes energy conservation in a company as similar to weight loss for an individual. It is necessary to first measure and understand the current state of energy consumption to determine where to start in developing a carbon-reduction plan. Chur provides solutions from a systemic perspective to help companies navigate this process.

Collaborating with ecosystem partners to meet energy conservation needs

Chur, a renowned system integrator in Taiwan, originally started out in equipment networking. They long ago recognized the importance of energy conservation and carbon reduction for enterprises. For this reason, Chur chose to develop energy management practices based on Advantech’s WISE-iEMS solution. Liao pointed out that integrating Chur’s and Advantech’s solutions allows for the acquisition of information regarding equipment-related energy consumption, which is then aggregated and presented through Advantech’s WISE-iEMS energy management system. This assists enterprises in monitoring, analyzing, and managing

energy consumption, allowing them to reduce carbon emissions and better conserve energy.

For instance, the biggest food processing plant belonging to an international fast-food corporation in Taiwan adopted Advantech’s solution to track electricity, water, and gas usage within their facility. Through this monitoring, they identified that the highest energy consumption occurred during production line changeovers. Consequently, they revised their production schedule to consolidate orders and decrease the frequency of line changeovers, ultimately reducing energy consumption.

Expanding their ongoing collaboration with Advantech, Chur has now become part of the Advantech Sustainable Ecosystem. Their goal is to effectively address energy-saving and carbon-reduction requirements in a comprehensive manner. “In the past, Chur could only provide single-point services, but now that we have become an important partner in the Advantech Sustainable Ecosystem, we can further expand our service capacity. With Advantech’s iEMS solution, enterprises and even multinational companies can be provided with all-around energy-saving services for critical energy-consuming facilities,” explained Liao. He emphasized that by becoming a member of the Advantech Sustainable Ecosystem, Chur will enhance its visibility among businesses and play a more significant role in helping companies reach their carbon-reduction objectives. ■

Carbon Trading Platform: Net Zero Carbon Offset

Interview with Wen-Feng Huang, General Manager of Net Zero Carbon Offset



Governments worldwide are implementing the Carbon Border Adjustment Mechanism (CBAM) to encourage industries to reduce their carbon emissions. Wen-Feng Huang, General Manager of Net Zero Carbon Offset, indicated that carbon trading will become crucial for all future businesses. Enterprises must realize the importance of their early involvement in carbon credit planning and formulate effective procurement strategies to reduce operating costs and enhance competitiveness.

Leading enterprises to connect with the global carbon rights trading trend

Net Zero Carbon Offset was established in 2022. Focusing on the needs of enterprises, they immediately deployed an international carbon trading platform to provide trading services and bridge the gap between carbon credit buyers and sellers. Mr. Huang explained that despite the numerous carbon credit trading activities in the market, many businesses do not properly understand the concept of carbon credits, resulting in the purchase of credits that do not meet their procurement requirements. Moreover, unscrupulous operators may fraudulently exploit carbon credit issues or sell expired or fake carbon credits. Transparent transactions made via Net Zero Carbon Offset's trading platform—NZ Carbon—can safeguard the interests of

both buyers and sellers, thus ensuring valid and authentic carbon credit acquisition.

Mr. Huang emphasized that achieving net zero emissions requires three stages of implementation: inventory, reduction, and offset. Net Zero Carbon Offset currently focuses on the offset stage, but they aim to collaborate with partners to help develop a comprehensive carbon reduction blueprint as a starting point for businesses, which is the reason they joined Advantech's sustainable ecosystem program.

In conclusion, Mr. Huang stated that at the inventory stage, they will leverage Advantech's digital platforms, solutions, and ecosystem partners to provide consulting services for businesses implementing ISO 50001, ISO 14064, and ISO 14067. At the reduction stage, the multiple aspects and service providers in the carbon reduction sector will need to collaborate with Advantech and its ecosystem partners. Ultimately, the synergistic benefits that can be achieved with Net Zero Carbon Offset as the largest carbon trading platform will enable the realization of net zero emissions goals. ■

iEMS/Compressor : Optimize Compressor System Performance

Achieving Compressor System Management & Energy Efficiency



Compressor

AI Compressor System Operation Optimization



Avoid Malfunction With Real-Time Monitoring



Prevents Costly Repairs With Preventive Maintenance



Optimize System Performance With Smart Compressor Control



Reduce Energy Waste



Leakage & Pressure Drop Analysis

Real-Time Monitoring & Abnormal Alarm

Compressor System Overview



Enabling an Intelligent Planet

Collect operating parameters and provide optimization strategies for energy savings in HVAC systems.

Data monitoring	Historical data	Preventive maintenance	Error alarm	Data analysis	Intelligent group control
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Value: Save energy, reduce energy consumption, and improve equipment quality and efficiency

- Effectively enhance personnel efficiency and realize an **“unmanned (or with few staff on duty) air-compressor station”**

Centralized management of the air compressor station can optimize efficiency and reduce waste, helping to reduce energy consumption by 10%~30%	The error alarm and preventive maintenance services help enterprises increase the equipment health by 10%~20%	The organization's operational and maintenance efficiency can be increased by 10%~30%
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- Automatic Real-Time Monitoring
- Operating Parameter Settings & Monitoring
- Compressor Operation Control
- Alarm With E-mail & Mobile Notifications

Explore iEMS/ Compressor

WISE-iEMS Total intelligent Energy Management Solutions

ESG / Carbon Neutral / Net Zero / Carbon Reduction / CBAM / CCA



ADVANTECH

Enabling an Intelligent Planet



iEMS/CarbonR	<ul style="list-style-type: none"> Review enterprise carbon emissions and product carbon footprint with a digital carbon inventory system and strategy to improve energy efficiency. The goal is to help enterprises manage their carbon assets in compliance with ISO 14064/ ISO 14067 to achieve carbon neutrality targets.
iEMS/ECOEnterprise	<ul style="list-style-type: none"> Customizable management inspection dashboards and KPI control for projects like SBTi & RE100, etc.
iEMS/ECOWatch	<ul style="list-style-type: none"> Monitors energy consumption of utilities, makes statistical comparisons, manages demand and resource allocation, with automatic energy declaration and compliance with ISO50001, etc. to assist enterprises with complete digital energy transformation in pursuit of energy conservation to achieve emission reduction goals.
iEMS/HVAC	<ul style="list-style-type: none"> Performs energy-saving control and predictive maintenance to realize intelligent management of the whole process.
iEMS/Compressor	<ul style="list-style-type: none"> With an ideal combination of centralized control and information processing of the compressor system, energy-saving control and predictive maintenance can be realized. This improves the management efficiency of the entire compressed air system.
iEMS/PHM	<ul style="list-style-type: none"> This system detects abnormalities and wear of motor equipment, determines the status of equipment, and improves the maintenance efficiency of rotating mechanical equipment to increase equipment service life and reduce life cycle operating costs.

Energy Management Products



Succeed in the IoT Ecosystem with WISE–Marketplace's Varied Services and Solutions

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Proof-of-Concept Cost

Accelerate
Time-to-Market

Expand
Business Landscape

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(Public Cloud, private cloud, hybrid Cloud)

Technical support
across 27+ countries

Lead generation &
co-marketing exposure



We offer

Scalable platforms
& tools with modularity

60+ industrial
applications

20+ edge-to-cloud
solutions

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Enabling an Intelligent Planet

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- Experience unparalleled support from our global technical team.
- Expand your customer base with lead generation and co-marketing exposure.

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Experience

Expand

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