My WISE-PaaS

An Advantech Magazine E&E 2020-2021

Technology Innovation Drives Forward Sustainable Development

ENERGY STORAGE

ADVANTECH
WISE-PaaS
AIoT Solutions & Marketplace

■ Power Insight

Taiwan's Industries Must Join Hands to Co-Create Innovative Water Treatment and Power Dispatch Solutions

8

■ Application Story

ITRI and Advantech Helped Ranitec Deploy Intelligent Wastewater Management Solution in India

12

■ WISE-PaaS

Advantech Builds a Global Water Treatment Ecosystem Around WISE-PaaS 4.0

28

CONTENTS

Advantech Industrial IoT Academy

The Most Consolidated On-line Learning Platform for Acquiring Industrial IoT Knowledge

On-Line Certification
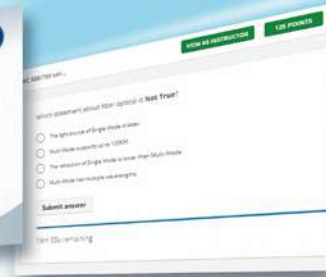
On-Line Tests

Clear Learning Path Guidance

Visualized Learning Evaluation

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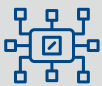
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Collaboration and Co-Creation Enable Fast Deployment of Sustainable Projects

Population growth has led to the overexploitation of both renewable and non-renewable resources. Unlimited consumption has exacerbated the emission of greenhouse gasses and pollutants and humans are largely to blame for the crisis, but game changing solutions are being developed capable of reversing the trend. The sustainable use of both non-renewable and renewable resources is one of the biggest challenges we all face.

In line with this global consensus, the main topic of this current issue of My WISEPaaS is the creation and promotion of local service ecosystems. Together with domain-focused solution integrators (DFSIs) domain specific energy and environment (E&E) solutions are co-created. The intention is to complement each other's strengths to better deliver local services to end customers. These eight application stories demonstrate how DFSIs and Advantech's partnership achieves sustainable development.

E&E Department Product Manager LF Jacky Chang, will give readers insights into Advantech's new strategy of building local service ecosystems. These ecosystems are aimed at accelerating the implementation of E&E applications and driving the corresponding market forward.

In the Power Insight section, professionals from the Industrial Technology Research Institute (ITRI) and the Taiwan Power Company discuss smart innovations and co-creation models for two verticals — water resource management and smart electricity grids.

This issue also features eight insightful cases concerning environmentally sustainable smart applications. Advantech's solutions helped Shanghai PTIT Network Engineering and Mirai Electronics implement remote solar energy monitoring and management.

The Indonesian DFSI, Eforel, developed a pump station monitoring system for a local water agency that acquired real-time information from disparate pump stations that improved management efficiency. Theses successful cases highlight our co-creation strategy between Advantech and DFSIs. They show how we overcame application issues in the E&E sector and created an innovative selection of smart solutions that could also be applied to other verticals.

In the Customer Partnership section, StarTech utilized Advantech's software, hardware, and WISE-PaaS cloud platform to meet their E&E project requirements. This collaboration delivered fast system integration and customization services to customers in the Gulf Cooperation Council region.

Advantech's co-creation goal with DFSIs provides a road map for further large-scale replication of E&E solutions. Future collaborations are scheduled which will enable customers to execute sustainable projects quickly and easily, thereby creating a greener future for us all. ■

Advantech Builds Localized Ecosystem with 1+N Strategy to Promote E&E Smart Development

To accelerate the global implementation of smart energy and environment (E&E) applications, Advantech is focusing on high-growth markets and using its 1+N strategy to build localized ecosystems and assist more than 500 domain-focused solution integrators (DFSIs) with developing innovative services and co-creating sustainable, green, smart applications.

Photos provided by Advantech
Interview with LF Jacky Chang, Product Manager of Energy and Environment Department, Advantech

Because of its experience promoting E&E smart development around the world, Advantech has amassed unique domain knowledge of various vertical application sectors. However, because every country has different environmental protection laws and regulations, replicating smart applications from one market to another can be challenging. To address this issue, Advantech's new strategy is to build localized service ecosystems that will accelerate the implementation of smart E&E applications.

According to (LF) Jacky Chang, Product Manager of Advantech's Energy and Environment Department, "For many years, Advantech has pushed a strategy of co-creation and continuously improved its software, hardware, and WISE-PaaS cloud platform services. Advantech also continues to connect with partners in regional markets around the world through co-creation joint ventures (CCJV). Furthermore, we are deploying our new 1+N strategy in the regional markets of Taiwan, China, Southeast Asia, Europe, and the United States in order to cultivate SaaS providers in the E&E sector. These SaaS providers serve as key links to the numerous DFSIs who build local ecosystems and help create the momentum for realizing smart E&E applications and smart sustainability globally, while also achieving a greener earth."

Transforming business with integrated application services

Intelligent O&M (operations and maintenance) is a major trend in the E&E industry and has grown into a huge market. Applications of intelligent O&M aim to reduce overall resource costs and improve operational efficiency through security management, asset lifecycle management, and remote management. Advantech has adopted its new 1+N strategy to develop innovations in these application areas. Jacky explained, "Advantech's newest software service framework—DeviceOn/BI—will play a vital role in promoting the 1+N strategy." DeviceOn/BI will be officially launched in November of 2020. The platform is designed to assist intelligent E&E SaaS providers with optimizing O&M management through the following four key features:

Firstly, plug-and-play functionality enables devices to collect and upload data to the cloud platform as soon as they are powered on, significantly streamlining the entire process. Secondly, considering services as "things" allows data in the cloud to be used for planning equipment services through digital twinning technology. With digital twinning technology, a digital replica is made of a physical entity. This allows both the elements and dynamics of how an IoT device operates to be monitored in order to improve usability, flexibility, and scalability. For example, by digital twinning a motor, all related data including voltage and operating parameters can be monitored, allowing users to better manage motor equipment.

Thirdly, ecosystems support E&E DFSIs in various application fields, enabling them to upload their solutions and industrial apps to the platform to share with others. Fourth and lastly, DeviceOn/BI connects the WISE-PaaS platform with private clouds at the network edge and public clouds such as Azure and Ali Cloud.

Building localized ecosystem for storing renewable energy

After the launch of DeviceOn/BI, Advantech will focus on the E&E industry's high-growth application markets, such as water treatment and water resources, energy storage and solar energy, distributed architecture, and smart substations. Using solar energy storage applications as an example, Jacky pointed out that solar energy generation relies heavily on energy storage, which drives the development of the energy storage market. According to a report by the International Renewable Energy Agency (IRENA) titled "Electricity storage and renewables: Costs and markets to 2030", the global energy storage market will reach US$26 billion by 2022.

Additionally, it is estimated that by 2025, the global energy storage market will have a compound annual growth rate (CAGR) of 16%, with US$7 billion worth of growth each year. Real-time integration services and tool application services are expected to account for one-third of the entire energy storage application services market. This highlights the enormous potential for smart applications in the energy storage industry. Advantech aims to seize the tremendous business opportunities in this market by building localized energy storage ecosystems in different regional markets, in accordance with its 1+N strategy.

Jacky explained that the architecture of smart energy storage systems includes energy storage cabinets, battery cabinets, solar energy generation equipment, cables, and load balancing technology. Advantech seeks to identify application fields where it can provide relevant solutions using its software and hardware products. For example, in the field of energy storage, the systems for energy management, battery management, and power control all have high-growth potential.

The equipment needed to build these types of systems include supervisory control and data acquisition (SCADA) hosts, programmable logic controllers, sensor I/O modules, wireless sensors, and data gateways. In addition to providing such equipment, Advantech is leveraging its open WISE-PaaS platform to build localized ecosystems in regional markets in accordance with its 1+N strategy. In collaboration with SaaS providers and DFSIs, Advantech aims to co-create asset management and O&M service models, such as guided services, shared services, and complete services.

"The platform serves as the means, not the end result; it is a tool to connect partners, which is the basis for developing IoT," Jacky concluded. With this as the key concept, Advantech will promote its new 1+N strategy in E&E markets. Moreover, Advantech expects to support the successful digital transformation of more than 500 DFSIs worldwide within the next few years. Advantech hopes that by building industrial E&E applications, the company can promote E&E smart development. ∎

Taiwan's Industries Must Join Hands to Co-Create Innovative Water Treatment and Power Dispatch Solutions

In pursuit of reliable water resources, stable power supplies, and a more sustainable planet, Taiwan's tech industries are using smart technologies to improve water treatment, power distribution, and power dispatch.

Interview with Teh-Ming Liang, the Water Technology Research Division, Industrial Technology Research Institute ; Chin-Chung Wu, Director of the Distribution and Service Division, Taipower

To lessen the negative impact of environmental change, the sustainable use of resources must be a shared priority for everyone. Taiwan, as a substantial contributor to the global economy, has reached a consensus on cooperation to use smart technologies that improve water treatment, power distribution, and power dispatch.

Emerging demands for intelligent water treatment

Dr. Teh-Ming Liang from the Water Technology Research Division of the Industrial Technology Research Institute (ITRI) pointed out that water treatment technology has a wide application range, including water supply projects, factory wastewater treatment, general sewage treatment, and water recycling and reuse. Currently, every application is highly dependent on IoT technologies to improve treatment efficiency and performance. Although business opportunities for water treatment are emerging and growing globally, the intelligent water treatment market is in its infancy, and the integration of operational technology (OT) and information technology (IT) in water treatment plants has just started. Taiwan should integrate OT and IT resources as soon as possible to create innovative solutions and seek business opportunities both domestically and internationally.

Dr. Liang explained, "The deployment of water treatment solutions has two main aims - First, water quality must meet government standards. Second, the energy, personnel, and chemical costs involved in water treatment must be reduced. Consider industrial wastewater treatment as an example, the composition of wastewater discharged from a factory is determined by the types of products produced. Therefore, if wastewater treatment equipment is operated under fixed conditions, it is likely to violate water quality standards.

For this reason, intelligent OT and IT technologies must be deployed to address this issue. In terms of urban wastewater, increasingly stringent laws and regulations have brought about the need for digitalization.

Exploring business opportunities in Vietnam with Advantech

To meet demands for the deployment of intelligent industrial and urban wastewater treatment, ITRI

integrated Advantech's software and hardware and open cloud platform solution aimed at wastewater treatment. The two parties, with many years of domain knowledge between them, have collaborated on several wastewater treatment projects in the past, such as the Chu-Tung Water Recycling Center project, successfully showcasing their capabilities.

In order to replicate their field-proven solutions in other countries, ITRI and Advantech established a domain-focused system integrator (DFSI) company that focuses on water treatment. For this company, they leveraged ITRI's experience of promoting water treatment solutions in Malaysia, Indonesia, Vietnam, and India. They also took advantage of Advantech's system integrator (SI) partners and marketing resources in Southeast Asia to capitalize on the rapidly emerging water treatment business opportunities in the region. For example, due to Vietnam's rapid economic growth, massive development of the manufacturing industry, and the country's increasingly rigorous environmental protection regulations, the country offers huge market potential for wastewater treatment applications.

Ancillary services accelerate the smart green energy industry in Taiwan

Because of the provisions of Taiwan's Electricity Act, only renewable power generation companies and green energy distribution companies can sell electricity through Taipower's transmission and distribution grids in the form of power wheeling or direct supply. The sale of electricity has not yet been opened to companies in the private sector, which means the electricity generated by privately-built generators cannot be resourced. Accordingly, through the promotion of ancillary services, Taipower has been able to access various power resources generated by the private sector via a power trading platform. This plays an important role in augmenting resources to secure an integrated service for customers. The construction of this private sector resource has led to new green power generation initiatives in Taiwan and encouraged the development of the smart green energy industry.

According to Mr. Chin-Chung Wu, Director of the Distribution and Service Division at Taipower, several types of ancillary services are implemented in Taiwan,

including demand response (DR), aggregators, self-use power generation equipment, frequency response reserve (FRR), and automatic frequency control (AFC). FRR mainly responds to large power losses caused by accidents. AFC resolves frequency instability caused by unbalanced power supply and demand, and, similar to FRR, provides an instant response to frequency drops in order to maintain a stable power supply.

Mr. Wu asserted that "promoting ancillary services not only ensures a stable power supply, but also contributes to the development of domestic energy-related industries. For example, AFC can enhance the competitiveness of the energy storage industry. In 2020, Taipower launched open procurement of its Energy Storage Automatic Frequency Control (AFC) Service for the first time. A total of five Taiwanese manufacturers won bids. In the future, Taiwanese manufacturers will cooperate with international manufacturers to build and maintain energy storage systems in Taiwan. This will be a good training opportunity for Taiwanese manufacturers and will enhance their development of power bank technologies and ability to integrate and build energy storage systems."

Mr. Wu emphasized that regardless of the type of ancillary service used, the reason for leveraging internal and external power resources is to achieve a stable and sustainable power supply. Moreover, in order to optimize power dispatch and distribution, power resources from all power grids must be integrated on a single platform using intelligent systems. Clearly, smart technologies play a crucial role in the development of green power and a stable power supply. In the future, IoT industry vendors who are committed to promoting the implementation of smart energy, such as Advantech and Intelligent Cloud Plus, will become part of the smart green energy ecosystem and work together to complete the last mile of green energy popularization. ∎

Eforel and Advantech's Real-Time Pump Station Monitoring System Improves Efficiency

PT. Eforel Citra Utama (Eforel), an Indonesian systems integrator, helped a local water agency enhance their water management system by installing a real-time pump station monitoring system. The system significantly improved the agency's water management efficiency by allowing them to monitor the station's operations and perform predictive maintenance.

Photos provided by Fotolia
Interview with Hanggar Cahya Kusuma, Managing Director, Eforel

Accelerated industrial development and resulting climate changes have made water management increasingly challenging. Given the rate of population growth and increases in agricultural output, pumping stations are critical pieces of modern water management infrastructure. Typically, to ensure optimal conditions, single engineers will monitor and report the condition of individual pumps in a station. Although this allows

inspectors to identify equipment in need of periodic repair and maintenance, reactive maintenance is inefficient and labor-intensive.

IIoT wireless I/O and sensor modules for data acquisition

The Indonesian government water agency was tasked with optimizing and maintaining the country's inefficient and outdated pumping stations. To accomplish this, they sought a total solution that would enable remote real-time monitoring and diagnosis of pump stations and other key infrastructure. It was provided by Eforel, one of Advantech's domain-focused system integrators (DFSI).

Established in 1994, Eforel specializes in water management, transportation, energy, mining, and automated production applications. The company's real-time pump station monitoring system leveraged their in-depth domain knowledge and expertise, combined with Advantech products, specifically, cloud IoT technology and device-to-cloud solutions.

For this solution, Advantech's WISE-4000 IoT wireless I/O modules and ADAM-6000 Ethernet I/O modules were

installed in various locations to acquire sensor data. ADAM-3600 intelligent remote terminal units (RTUs) were deployed for data preprocessing via WISE-PaaS/ EdgeLink. Data was then transmitted to local WebOP-2070T operator panels installed with WebAccess/HMI software and an ACP-4000 SCADA server via the MQTT protocol. ADAM-3600's multiple I/O were used for monitoring current, voltage, frequency, pump start/stop states, inlet/outlet pressure and flow, water levels, and water quality.

Easy integration with existing platforms and WebAccess/SCADA dashboard

With the client's static IP network server setup, the ADAM-3600 RTUs and WebAccess/SCADA software used the MQTT communication protocol to maintain an active connection to the server side. Without this active connection, the server would be unable to obtain monitoring data for remote management. Another requirement was to integrate existing software platforms compatible with HTML5. Using HTML5, real-time data could be accessed and visualized on the WebAccess/ SCADA dashboard.

This solution offered the water agency several benefits, including reduced cost and labor requirements, while increasing productivity. Now, the water agency can remotely monitor geographically disparate pump stations in real time and conduct centralized management via their WebAccess/SCADA powered dashboards. In collaboration with Advantech, Eforel reduced the time required to maintain pumping stations by providing a cost-effective, feature-rich solution that exceeded the agency's usage needs.

According to Eforel, selecting Advantech as a partner transformed their offering from a basic product to an added-value solution that satisfied the client's industry-specific infrastructure requirements. "When expertise meets advanced integration, savings and increased productivity are the added value," said Hanggar Cahya Kusuma, Managing Director of Eforel.

The success of this project can be attributed to the integration of Eforel's industry expertise and Advantech's products and solutions. Eforel, Advantech's DFSI partner and WISE-PaaS VIP member, is offering more solutions based on the WISE-PaaS cloud platform. By fulfilling demands for industrial IoT across Indonesia, Eforel is expecting positive future growth. ∎

ITRI and Advantech Helped Ranitec Deploy Intelligent Wastewater Management Solution in India

Advantech and The Water Technology Research Division of the Industrial Technology Research Institute (ITRI) in Taiwan helped the largest Common Effluent Treatment Plant in Tamil Nadu upgrade their outdated wastewater treatment system. Upgrading this system increased water recover rates and reduced operation costs and energy consumption.

Photos provided by Shutterstock
Interview with Yaju Juang, Researcher of the Water Technology Research Division, ITRI; Chih Huang, AIoT Engineer of the Water Technology Research Division, ITRI

India is the world's second largest producer of footwear and leather goods. It accounts for around 12.9% of the world's production of hides and skins. Tamil Nadu, the southernmost state of India, is home to 50% of India's tanneries. A small tannery, with the capacity to process 3 to 4 tons of hides and skins a day, uses 100,000 liters of water in the same time period—the daily household requirement of 2,500 people. In sum, the industry is highly water-intensive. The combination of dwindling water resources, a growing population, increasing pollution, and inefficient water management has resulted in many years of severe water stress in Tamil Nadu.

To address the issue, the non-profit Chennai Environmental Management Company of Tanners, was

formed to implement the state government's Zero Liquid Discharge (ZLD) project. Additionally, six Common Effluent Treatment Plants (CETPs) were established in Tamil Nadu to help tanneries unable to install expensive water treatment facilities. At present, the current CETP are facing problems and need to be upgraded. Seeking solutions to improve their outdated facilities and reduce operation costs, one of the six CETPS, Ranipet Tannery Effluent Treatment Company Ltd. (Ranitec), approached the Water Technology Research Division of ITRI and Advantech.

Patented BioNET® technology improves wastewater treatment processes

Ranitec, as a benchmark plant, is the biggest CETP in Tamil Nadu for India's tannery and leather industrial sector. Although pre-treatment facilities were constructed in both Ranitec and member tanneries' sites, pre-treated wastewater still has high Suspended Solid (SS), Biological Oxygen Demand (BOD), and Chemical Oxygen Demand (COD) values. These values result in Ultrafiltration (UF) and Reverse Osmosis (RO) membrane fouling, low water recovery rates, high energy consumption, and other related issues. They also create substantial dry solid waste after the final Mechanical Vapor Re-compression (MVR) process.

Membrane fouling requires intense cleaning or membrane replacement and increases operating costs. Also, Ranitec has been operating for over 2 decades, and the accumulated non-recyclable/non-reusable mixed solids is failing to meet the ZLD project's goal.

To address these issues, ITRI proposed a pilot project that combined the patented BioNET® Biological Polishing System with their Membrane Bioreactor (MBR) and Electrodialysis (EDR) systems. Yaju Juang, Researcher for ITRI's Water Technology Research Division, pointed out that ITRI's wastewater treatment solution has been used successfully by many Taiwanese companies. Likewise, BioNET® technology is far more advanced and cost-effective than comparable solutions. The BioNET® reactor's porous compressible carriers provide large surface areas for the interception of SS and growth of microorganisms.

After implementing ITRI's water treatment solutions, BioNET® technology and MBR reduced ammonia by 96%. Similarly, wastewater BOD and COD were greatly reduced – making condensate reusable, improving water

recovery rates, and extending the lifespan of UF and RO membranes.

Additionally, EDR minimized the inlet volume of brine to MVR, while decreasing energy consumption and increasing water recovery. After passing through MBR, BioNET®, and EDR, the volume of the concentrated wastewater has decreased by 100 tons per day. This made treatment in the final MVR process more efficient and saved Ranitec USD one thousand per day in operation costs.

Reliable solution enables successful system replication

ITRI introduced Advantech's hardware and water treatment industrial app to remotely monitor ITRI's wastewater treatment solutions and collect sensor data. Chih Huang, AIoT Engineer at the Water Technology Research Division of ITRI, commented that ITRI and Advantech's intelligent wastewater management solution has been used in several projects over the years. By leveraging ITRI's water treatment expertise and Advantech's experience in industrial applications, this wastewater solution was successfully replicated in Ranitec's project. BioNET®, MBR, and EDR systems' programmable logic controllers (PLCs) were connected with Advantech's ECU series Industrial Edge Computing Gateway units. The data captured from PLCs is sent to the WISE-PaaS platform, allowing data monitoring from ITRI's Taiwan office. Ranitec can also access WISE-PaaS to monitor water quality, water volume, and equipment operating statuses in real time to optimize efficiency. An AI engine was developed from the collected data to further optimize ITRI and Advantech's wastewater treatment solution following the pilot project.

Water/wastewater treatment needs to prepare cloud service functions in the IoT era by adopting automated monitoring and control. Advantech's WISE-PaaS platform has surpassed general SCADA software in vertical and horizontal integration. Its abundant open architecture functions and tools fulfill system requirements and accommodate future expansion. Using Advantech's global distribution network and this powerful platform, ITRI and Advantech are able to significantly increase the efficiency of project development and after-sales maintenance. They can also promote the Intelligent Wastewater Management Solution to CETPs in India and other countries. ∎

National Center for Traditional Arts Implements Energy Monitoring and Management System to Improve Management Efficiency

In an effort to implement an energy monitoring and management system, Gow Jiun Industrial CO., LTD. utilized Advantech's energy management solution in the National Center for Traditional Arts (NCFTA). This solution significantly improved the center's management efficiency, saved on labor costs, and enhanced the park service quality.

Photos provided by Shutterstock
Interview with Li Wei Chen, General Manager, Gow Jiun Industrial

At NCFTA, collecting electricity usage and meter readings from lighting and air conditioning equipment was previously a manual process. After adopting Advantech's energy monitoring solution in their smart
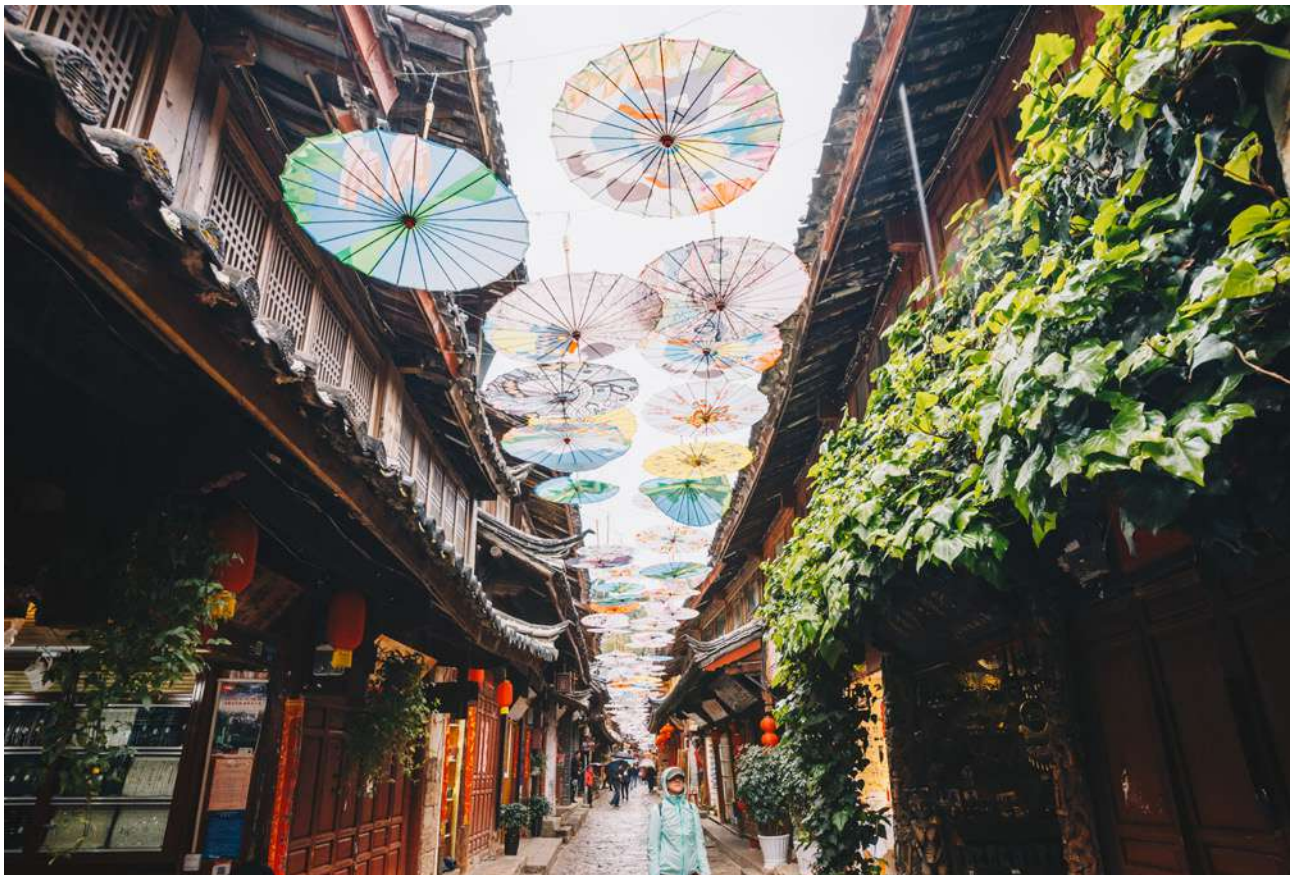
park, staff at NCFTA have been able to remotely monitor equipment and electricity consumption through automatic scheduling of equipment on/off times. This system helps promptly notify staff of abnormalities to enable effective management and streamline the park's energy management operations.

Real-time monitoring reduces management load

When the Sunmake Cultures Foundation took over management of the NCFTA in 2016, they found that the park's electrical equipment used an outdated inefficient labor-intensive management model. To address the situation, the foundation approached Gow Jiun Industrial CO., LTD., who helped them develop a more efficient energy management system. Six of the park's areas, and its high-voltage electrical equipment rooms, were selected for lighting and air conditioning improvements in the first phase.

According to Li Wei Chen, General Manager of Gow Jiun, the 24 hectare park had electrical equipment control panels scattered around the facility. Physically operating these panels required wasting time and energy walking from place to place. Additionally, the lack of monitoring devices necessitated reading meters manually to acquire energy consumption data. Furthermore, the lack of abnormality detection mechanisms led staff to wait for on-site reports on electrical equipment malfunctions before taking corrective action. This had a negative effect on the park's service quality and brand image.

Gow Jiun's energy monitoring and management system for the NCFTA provided equipment on/off remote control, as well as automated meter reading, energy consumption analysis, and instant abnormality reporting. These advanced features significantly reduced management loads and yielded three specific benefits.

First, it previously took administrators about two hours each day to activate/deactivate control panels and read meters. After connecting the equipment to a network, these tasks could be completed through scheduling and remote control. Now, daily on/off operations are executed by the system, saving time and labor.

Second, the system automatically collects meter data from each area to display consumption data and trend graphs in real time. These functions help administrators conduct in-depth analysis of the park's electricity demands and efficiency improvements can be reviewed before bills are received.

Third, abnormal status reports are sent proactively through email. This allows administrators to address issues as they arise; reducing complaints and improving services at the park.

Advantech's complete solution accelerates system implementation

The energy monitoring and management system used by Gow Jiun is based on Advantech's energy management solution. When combined with Advantech's support services it yields several unique advantages.

First, Advantech's solution contains the software and hardware required to build the system — including WebAccess/EMS visualization software, a UNO-2483 embedded automation computer, an ECU-1152 industrial-grade gateway, and two ADAM modules. Mr. Chen pointed out that Advantech shipped the hardware to Gow Jiun with preinstalled software — saving time on installation and compatibility testing.

Second, the Sunmake Cultures Foundation wanted an energy monitoring system capable of incorporating other subsystems, such as drainage, fire protection, and safety management into the system. The open characteristics of Advantech's solution satisfied this requirement. "Compared to other solutions — which only provide limited support — Advantech's support is excellent in every regard. It includes communication protocols, drivers, and a library. This satisfies our current needs and adapts handily to our future needs," Mr. Chen elaborated.

Third, Advantech's software products provide ready-made charts, dashboards, and scheduling tools, allowing Gow Jiun to focus their human resources on mapping data instead of developing visualization tools. Additionally, the availability of various ready-made tools enabled Gow Jiun to plan a complete solution in two months. This is a vast improvement on the half a year to a year required in the past.

In addition to the NCFTA, Gow Jiun has used Advantech's solution to implement energy management systems in industrial plants, passenger transportation centers, and commercial office buildings. Looking forward, Mr. Chen emphasized that Gow Jiun is committed to collaborating with Advantech on building future smart applications aimed at helping industries improve management efficiency. ∎

PTIT and Advantech Collaborate to Assist in the Digital Transformation of China's PVPA

Shanghai PTIT Network Engineering Co., Ltd. employed Advantech's Solar Power Management Solution (SPMS) to complete a digital upgrade of the Photovoltaic (PV) Poverty Alleviation (PVPA) project in Taiqian County, Henan Province, China. The company provided an edge-to-cloud integrated system for enhanced remote monitoring, operation, and management.

Photos provided by Fotolia
Interview with Ling Jin, project manager, Shanghai PTIT

Ending poverty and environmental governance are two key development goals of China's current policy. The combination of these two objectives was the primary driver in formulating China's PVPA project measures. From 2015 to late 2019, China's National Energy Administration generated a total cumulative PV

capacity of 19.1 GW as part of the project, which provided assistance to 4.07 million of the country's impoverished households.

Given the project's perceived benefits, PV capacity was developed at an unprecedented scale and rate. However, the delicate operation and maintenance of PV systems restricted the operational efficiency of the PV power station equipment and components. It further inhibited the seamless integration of synchronous grid connectivity, consumption, and distribution. To bridge the disparity, the Chinese government called for local governments to establish operational management systems with the objective of integrating PV power information into the National Renewable Energy Information Management Platform. The government also implemented guidelines for data collection endpoints at village-level PV power stations.

Taiqian County was the key county for the PVPA project. Through collaboration between Shanghai PTIT Network Engineering Co. Ltd. and Advantech, the county's PV power stations were digitally transformed by integrating a cloud-based digital management system that provides transparent data on the incomes of impoverished farmers in the county. This data collection served to provide a quantitative basis for subsequent expansions and investment. These preliminary outcomes have now been met.

One-stop solution for distribution variance and management

Shanghai PTIT Network Engineering Co. Ltd. offers professional services in the field of new energy development. As the main contractor for the project, their extensive expertise in solution design, project implementation, and service provision allowed them to win the tender for the digital transformation of Taiqian County's PV power station project. To support their design, planning, and implementation, Advantech provided a solar power management solution for data acquisition and transmission, on-site monitoring, edge analytics, operation, and maintenance of cloud platforms, and app-based remote management.

To date, the PVPA project has generated over 15.35 MW of electricity across 125 village-level power stations. Compared to traditional power stations, however, the solar PV stations encountered multiple challenges involving operations and maintenance. The most prominent of those challenges was minimizing the effort for inspecting and maintaining smaller power stations dispersed over a large area. Initially, this required a considerable amount of human resources for diagnostics and maintenance. Compounding this problem, the county had a shortage of technicians and security personnel for maintaining and operating the PV power stations. To add even more to the complexity, numerous power stations were constructed using non-unified standards during the early phase of project development. This led to inconsistencies in the adoption of power inverters and communication protocols, making data acquisition more difficult.

According to Ling Jin, project manager of Shanghai PTIT, "Advantech has extensive experience in handling solution-oriented projects. They designed our solutions based on the scale and particular circumstances of each power station, then guided us on cabling methods, selection, serial port connection, and data processing. Within half a month, we were able to implement customized power station management solutions across 125 villages."

A Platform for remote operations, maintenance, and data monitoring

Advantech's comprehensive solution consisted of two components — a remote operation and maintenance platform and a field data acquisition structure. The remote operation and maintenance platform is supported by front-end communication, database, software applications, operation/maintenance servers, and reporting workstations. The equipment needs to handle an extensive variety of operational management tasks, including power station monitoring, endpoint data acquisition, and processing, data logging, cloud storage, power generation, and economic analyses, defect management and maintenance scheduling, predictive modeling, and data visualization. A communications management device was employed for remote data monitoring functions, enabling forward/reverse isolation and system security via longitudinal encryption and a firewall. The device allows for real-time data exchange and information sharing between the State Grid Electronic Commerce cloud platform, the Henan Electric Power Company, and the State Grid Materials Co., Ltd. platform.

For this project, Advantech's ECU-1251 edge
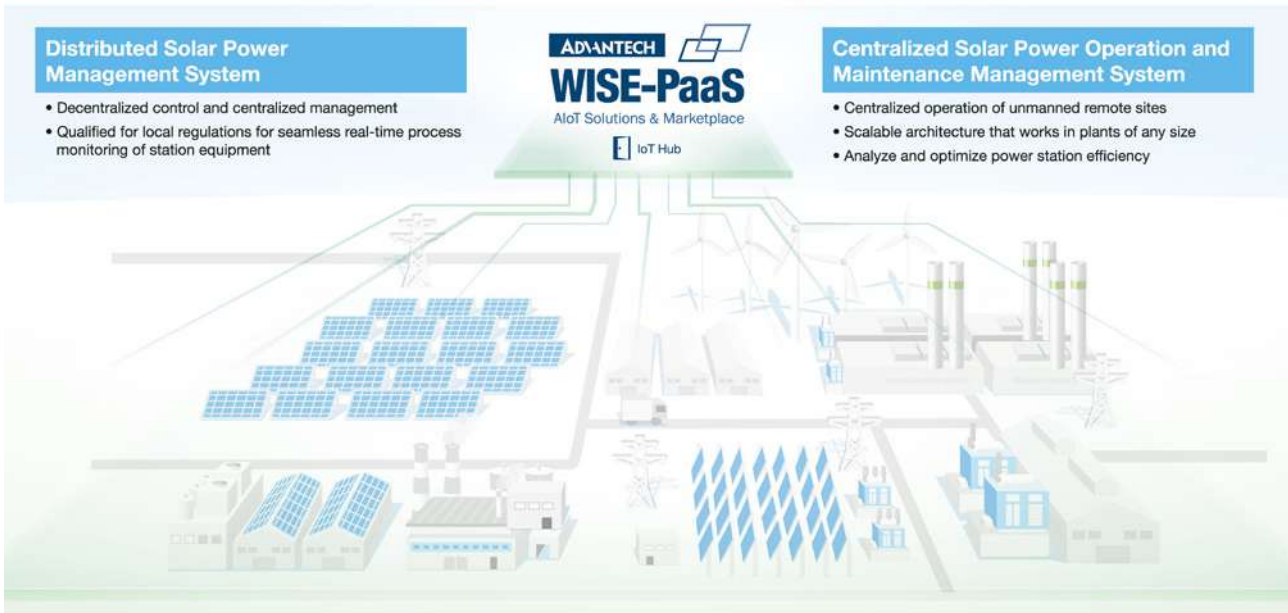
intelligence gateway served as a hub for data acquisition, data transmission, and edge management. The gateway's built-in VPN function enables remote system management, upgrading, configuration, and maintenance, resulting in reduced travel costs for on-site maintenance. Data acquisition is supported with intelligent functionality through the built-in program architecture. Because data is processed at or near the network edge, data transmission requires significantly less bandwidth and effectively mitigates network congestion.

Advantech deployed its unified monitoring framework, SPMS, on a private cloud to ensure data security, real-time operations monitoring, reduced diagnostic costs, and rapid problem identification. SPMS has become a critical asset for regional governments seeking to enhance their power grid's operational efficiency. The platform and a mobile app display important assets, data, and equipment tracking statuses, while providing alert notifications. The key benefits of these functions is allowing users to perform system-wide management and configuration. In addition, the built-in WISE-EdgeLink software in ECU-1251 supports data conversion, enabling on-site power station data to be integrated with the management system and cloud platform.

According to Mr. Jin, "Despite the project presently being in the pilot phase, the system is very stable and its performance has met our expectations." He also mentioned that the local government is extremely pleased with the pilot results, particularly with regard to the system's rugged design. "Advantech's products are designed to operate reliably in harsh conditions for long periods. This will ensure that long-term remote maintenance and upgrades can also be performed, providing a means for future services and function upgrades."

Collaborative efforts to develop and innovate in the new energy industry

Advantech's solution made the vision, management, and maintenance of the PVPA project a reality. Both the comprehensive real-time data collection from multiple power stations and the integration of system data into a unified management platform have enhanced the operation, maintenance, and management of the PV power stations. As the PVPA project enters its next phase — where reliable performance is expected for effective management, operation, and maintenance of the stations — the next critical step is to construct an efficient and digitized operational model. In the future, the basis for new energy source development and infrastructure expansion will see further innovative collaboration between Shanghai PTIT and Advantech. This win–win combination will pave the way for further customized integrated solutions and technical support, realizing a shared vision of co-creation and co-prosperity. ∎

Semiconductor Wafer Manufacturer Implements Automated Solution for Improved Waste Disposal

A world-renowned semiconductor wafer manufacturer implemented Advantech's LoRaWAN-based automated monitoring solution to improve waste disposal operations. The solution allows factory managers to assess equipment status in real time, identify system failures and abnormalities, and improve production line efficiency.

Photos provided by Shutterstock

Many hazardous chemicals are used to manufacture high-tech products. These chemicals are not only dangerous and cause pollution, but their disposal can be difficult to manage. To protect employees and ensure environmental safety, factories must install appropriate waste disposal systems and perform regular inspections. However, for factories with a high number of waste disposal systems, such inspections can be time-consuming and necessitate substantial human resources. Moreover, industrial waste gases are often dispersed via tall chimneys, which can be difficult and dangerous for inspectors to access.

A renowned semiconductor wafer manufacturer deployed Advantech's LoRaWAN-based automated monitoring solution at its factory in Taiwan to improve its waste disposal processes. This solution involved using wireless sensors and technologies to collect data automatically, which would allow managers to monitor waste disposal operations remotely and in real time for improved efficiency.

Implementing Advantech's LoRaWAN sensor and IoT gateway

The wafer factory is equipped with acid waste disposal systems for treating corrosive and hazardous liquids generated by photolithography and etching processes. The hazardous liquids must be handled in accordance with environmental protection standards. Factory staff must check the waste system motors and fans for anomalies using a handheld vibration meter.

However, because there are over 20 exhaust fans in the factory, the inspection frequency is limited to just once per day. Additionally, because the waste systems are installed on the factory roof, inspectors must climb up and down ladders multiple times per day.

The company decided to implement an automatic monitoring solution using sensors to reduce the risks posed to staff and enable more efficient inspections. To withstand the harsh environment, the solution hardware needed to be ruggedized and support long-range data transmissions to avoid signal interruptions or unstable network connectivity.

A dedicated network was also required to prevent data losses. Additionally, the system needed to support the Modbus communication protocol to allow data to be uploaded to the monitoring system.

Following a comprehensive assessment of the various solutions available on the market, the company selected Advantech's automated monitoring solution. Advantech's solution comprised WISE-2410 LoRaWAN smart vibration sensors and WISE-6610 LoRaWAN IoT gateway.

Advantech's solution enabled automated monitoring

The WISE-2410 sensors were attached to the waste system motor to collect vibration data in order to calculate speed and displacement eigenvalues. The data is transmitted to the WISE-6610 IoT gateway every 30 minutes via a LoRaWAN-based wireless network. WISE-6610 then decodes the data packets and uploads them to the factory's supervisory control and data acquisition
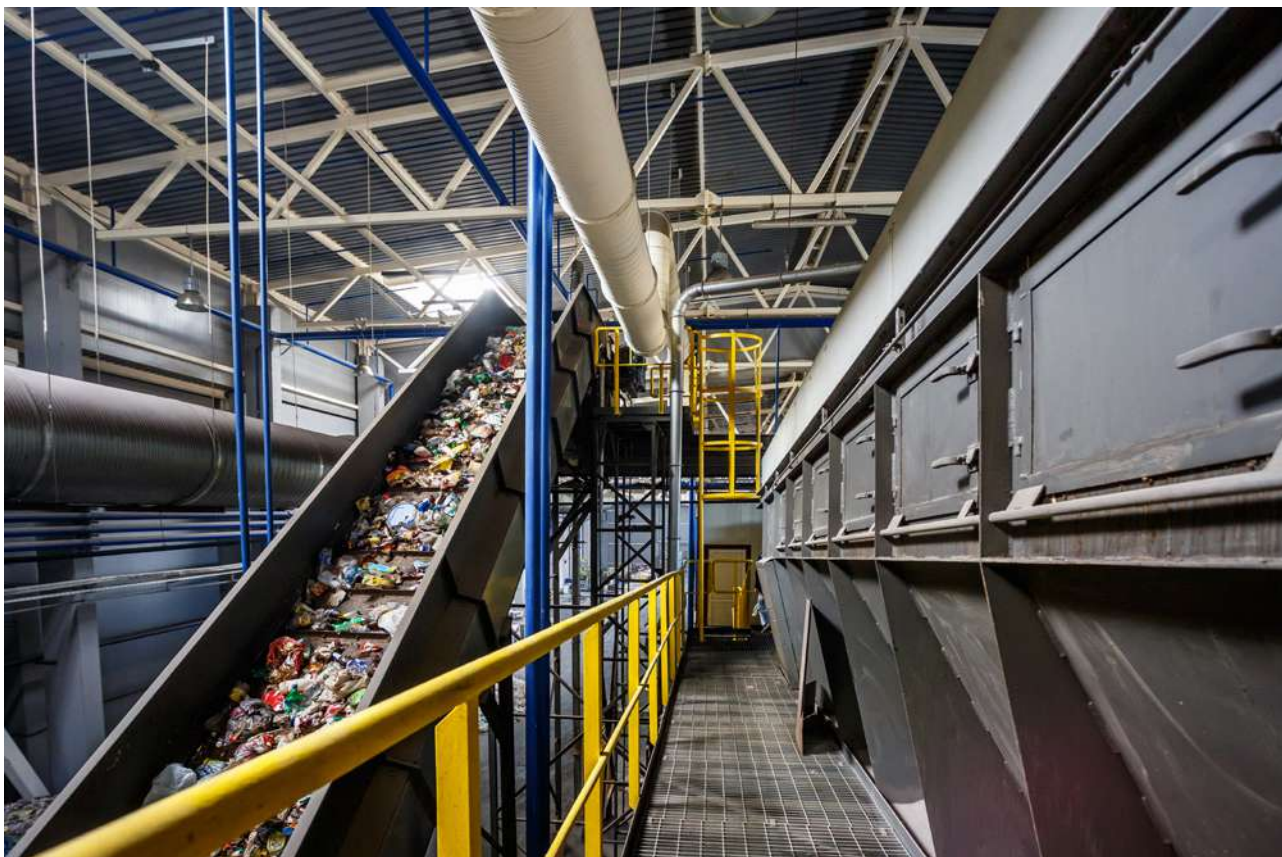
(SCADA) system using the Modbus protocol. The data is then compared with the ISO 10816 vibration severity chart to diagnose motor health.

Advantech's WISE-2410 sensors are smart devices with a built-in ARM Cortex-M4 processor, 3-axis accelerometer, and temperature sensor. WISE-2410 can calculate complex eigenvalues and output VRMS, ARMS, peak, displacement, kurtosis, crest factor, skewness, and standard deviation values. This ability to conduct data preprocessing helps to reduce network bandwidth loading. Additionally, the built-in LoRa transceiver consumes minimal power and supports low-frequency, long-range high-penetration signals, making it suitable for installation in the factory's 500 m² area.

WISE-2410 sensors also provide advantages associated with LoRaWAN, namely openness, flexibility, and low deployment costs. Users can establish propriety networks themselves without the assistance of a network carrier, allowing data to be transmitted directly to local systems. This enabled the wafer manufacturer to reduce costs by eliminating carrier fees, while providing enhanced data security.

WISE-6610 is a high-performance LoRaWAN IoT gateway that provides reliable connectivity for industrial environments. Additionally, because it supports the Modbus protocol, which is commonly used in factories, it fulfilled the wafer factory's need for a reliable data transmission gateway. Another benefit is that the WISE-6610 gateway can connect to up to 500 WISE-2410 devices, which enables the monitoring range to be expanded in the future.

Industrial waste disposal systems are essential for semiconductor factories. Manual labor inspection methods present serious health and safety concerns and are limited by the availability of human resources. Because the automated monitoring solution yielded such positive results, the wafer manufacturer plans to deploy it to other systems in the factory, such as the air-conditioning system.

Advantech's LoRaWAN-based automated monitoring solution improved the waste disposal processes and production line efficiency. ∎

Advantech Assists CAC with Building Substation Automation Systems in Myanmar

In recent years, electricity consumption in Myanmar has increased significantly. To improve energy management, the Myanmar government commissioned CAC Co., Ltd, to build a centralized substation monitoring system. Accordingly, at the beginning of 2020, CAC Co., Ltd, deployed Advantech's monitoring solutions substation automation systems at 10 substations around Naypyidaw, the capital of Myanmar.

Photos provided by Bigstock

Electricity is an essential resource required for nearly every aspect of modern life and has been key to making technological advances. Its ubiquity underpins a wide range of products and services that enhance our quality of life and stimulate economic productivity. Demand for electricity correlates positively and profoundly with population and economic growth. In an energy infrastructure, substations are essential for providing

uninterrupted electrical power. Automated substations have revolutionized the management of energy supply by enhancing substation control and protection while ensuring grid stability.

**Substation automation—a vital part of urban upgrading**

Governments around the world must utilize substations to ensure a stable and adequate power supply. With traditional substations, the systems are highly susceptible to human error due to the nature of mechanical equipment and the high number of manual switches. When issues such as power surges or circuit breaker trips occur, real-time monitoring and problem solving become key priorities for operators. However, for energy providers, unifying and integrating real-time monitoring, power dispatching, and management presents a significant challenge.

To address this issue, many governments have implemented substation automation. In keeping with this trend, the government of Myanmar sought to deploy substation automation solutions in order to improve the country's power grid infrastructure. CAC Co., Ltd, was contracted to assist the government with their substation upgrade project. Then, at the beginning of 2020, CAC Co., Ltd, participated in Advantech's technical training course. This course was recommended by Advantech's business partner in Thailand. After completing the course, CAC Co., Ltd, decided to collaborate with Advantech by using its complete solutions to build a centralized monitoring system and substation automation systems at 10 substations in Naypyidaw.

Fast, low-cost system construction using Advantech's complete solution

At the Naypyidaw substations, the electricity meters, circuit breakers, relays, and other monitoring equipment all required updating and integration. The solution provided by Advantech to achieve substation automation included its ECU-4784 industrial PC gateways, EKI-9226 switches, and 17" Full HD KVM monitoring screens. This solution enabled the communication protocols in the various facilities to be integrated, thereby unifying data acquisition, transmission, and monitoring. Moreover, the fanless ECU-4784 gateways offered maximum performance with minimal energy consumption.

Advantech's ECU-4784 gateways comply with
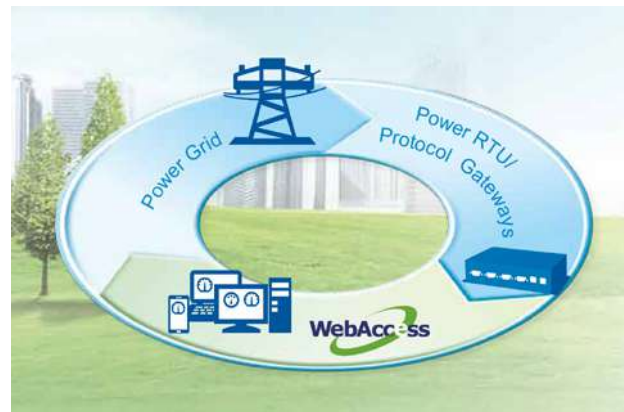
international standards regarding communication protocols used at substations, and can be connected to third-party RTU devices and EKI-9226 switches for acquiring DI/DO signals and IP-based machine status data. All acquired data are then integrated and uploaded wirelessly to a centralized control room. The installation of Advantech's KVM screens, which feature VGA and DVI-D ports, allow operators to view the on-site conditions of the substations remotely, enabling convenient real-time monitoring.

Advantech's solution hardware completely satisfied the requirements of the on-site environment. The EKI-9226 industrial rackmount Ethernet switches are IEC61850-3-certified and support an operating temperature range of -40~75°C/-40~167°F, making them ideal for harsh usage environments. Equipped with 20 SFP fiber-optic ports and six Gigabit RJ-45 ports, these switches can be connected to more than 20 IP devices and enable data to be uploaded to the ECU-4784 gateways. With this setup, the total internal reflection of the optical fibers prevents noise interference during data transmissions.

Advantech products offered the advantages of being easy to install and highly compatible, which allowed CAC Co., Ltd, to complete the building and upgrade project in under two months. They were able to successfully build and deploy substation automation systems at 10 substations to collect data for analysis and visualization. However, most importantly, the competitive pricing and high durability of Advantech's products significantly reduced the overall setup costs. In the future, Advantech will continue to develop intelligent solutions for every industry in order to facilitate the advancement of smart developments that improve society and life overall. ■

Mirai Electronics and Advantech Cooperate on Creating a Sustainable Future for Singapore

Mirai Electronics chose Advantech to be its strategic partner on a wide selection of remote energy monitoring and management projects. This partnership helped customers optimize energy consumption, improve maintenance efficiency, and reduce overall costs. Together, they contribute to developing a sustainable energy future for Singapore.

Photos provided by Fotolia
Interview with Mr. Bhanushali Kalpesh Trikamdas, Product Development Manager, Mirai Electronics

Singapore, a city-state with limited land, imports the majority of its energy resources. According to a 2018–2019 annual report from the Singapore's Energy Market Authority (EMA), gas is used to generate about 95% of the city states electricity. For many years, the EMA has been dedicated to seeking smart energy solutions aimed at

making Singapore's future more sustainable. One of the four solutions promoted by the EMA is solar power. Solar adoption rose to around 226 MWp in Q1 2019. Singapore is expected to reach the committed solar PV capacity of 350 MWp by end of 2020, and 1 GWp after 2020. Indeed, Singapore's latest energy policy has made many buildings and facility owners aware of the importance of energy monitoring and management. For example, Mirai Electronics and Advantech have cooperated with — and been involved in — many energy-related government programs and building/facility management projects.

Complementary strengths build successful projects

Based in Singapore, Mirai Electronics offers professional hardware and software solutions, as well as system integration and installation services for smart energy monitoring and management. Their mission is to improve sustainability through better energy and environment monitoring and management. As a participant in many EMA programs, such as, "The Intelligent Energy System Pilot" and the "Energy Grid 2.0 Program," their extensive expertise in solution design, project implementation, and service provision has convinced many companies from different industries — including the energy industry — to choose them as their energy and facility management solution vendor.

As Mirai Electronics' strategic partner, Advantech offers a wide range of edge computing devices, AI solutions, wireless connectivity solutions, embedded boards, industrial peripherals, and customization services. One notable smart energy monitoring and management project that Mirai Electronics carried out using Advantech's solutions was to provide a real-time PV monitoring system to YTL Power Seraya Pte. Ltd., a Singapore-based energy company.

When compared to traditional power stations, solar PV stations endure multiple operations and maintenance challenges. The most prominent of these challenges is minimizing the time and labor required for inspecting and maintaining smaller power stations dispersed across the city-state. Mirai Electronics and Advantech joined forces to deliver a comprehensive solution.

Dedicated remote monitoring and management platform for energy companies

The solar PV generators at YTL Power Seraya were located on two sites and consisted of ten inverters and four energy meters, all of which required remote monitoring from corporate offices. Advantech's UNO-2484 Embedded Automation Computer served as a data acquisition, data transmission, and edge management solution for this project.

Mr. Bhanushali Kalpesh Trikamdas, Product Development Manager of Mirai Electronics stated, "The UNO-2484 was connected to all sensors, meters, and inverters. It functioned as a stand-alone node or as a sub-node of a larger electrical Supervisory Control and Data Acquisition (SCADA) system. Should network connectivity be lost, the UNO-2484 saves and pushes data from the outage period to the cloud." Several Advantech ADAM series remote I/O and wireless sensing modules were integrated with the inverters, power meters, and other energy management-related sensors used for data acquisition. The UNO-2484, ADAM modules, and server were linked together for data transmission via an Advantech network switch.

In the corporate office, Advantech's powerful WebAccess/SCADA browser-based SCADA software and management platform, was used for centralized monitoring through various dashboards that were created for data visualization. The WebAccess/SCADA dashboard provides information such as power generation, power capacity, revenue statistics, energy consumption, power storage facility status, and real-time alert notifications. Mr. Trikamdas commented, "This has helped to lower downtimes, maximize solar power output efficiency, and perform predictive maintenance. In addition, the WebAccess/SCADA platform can be easily expanded if YTL Power Seraya builds more sites going forward."

Mr. Trikamdas told us that apart from offering a wide-range of hardware solutions and dedicated management software to the E&E sector, Advantech's global reputation and local technical and after-sale support, as well as reasonable pricing were the main reasons for Mirai Electronics to choose Advantech as their strategic partner. Using its extensive experience in the E&E sector, Advantech helped Mirai Electronics implement remote energy monitoring and management systems for many other customers, not only in the E&E sector, but also in many different industries, from manufacturing to food and beverage, hospitality, retail, and aviation. By improving power generation efficiency and security management, users of Advantech's total solutions can become more sustainable and cut costs. ∎

Italian Eyewear Manufacturer Reduces Energy Costs With an Energy Monitoring Solution

Net Surfing sought to significantly reduce a renowned Italian eyewear manufacturer's energy costs by adopting Advantech's cost-effective energy monitoring solution.

Photos provided by Shutterstock

In order to protect the environment, many countries are actively promoting the use of renewable energy.

Correspondingly, many enterprises have voluntarily started relying on green energy. Unfortunately,

establishing renewable energy systems require enterprises to make significant capital investments.

Several years ago Italy started promoting non-nuclear renewable energy resources. At present, more than 40% of Italy's electricity supply is generated with renewable resources. As a result, energy generation costs have remained consistently high. According to the International Energy Agency, Italy has the most expensive industrial electricity rates in the world. These costs have led Italian manufacturers to seek effective, cost reducing energy solutions. Industrial IoT technology helped these manufacturers get more with less. In this case, the Italian system integrator Net Surfing collaborated with Advantech to build a complete energy monitoring solution for a renowned eyewear manufacturer to improve their energy generation capacity and reduce their operating costs.

Net Surfing and Advantech collaborate to build a complete energy monitoring solution

The eyewear manufacturer commissioned Net Surfing to implement energy monitoring systems for its main factory and five sub-factories in Italy. They wanted to establish a data center at the main factory to collect and amass energy consumption data (electricity, gas, water) from all six sites, which were situated at different locations, for unified monitoring. To overcome security concerns, the manufacturer requested a virtual private network (VPN) to connect to a private cloud.

To meet the eyewear manufacturer's needs, Net Surfing planned to build a computerized maintenance management system (CMMS) and self-developed energy monitoring system called I4.0 Supervisor. To accomplish this task, they had to purchase gateways and supervisory control and data acquisition (SCADA) software. I4.0 Supervisor uses gateway devices to collect energy consumption and SCADA data, enabling manufacturers to efficiently improve energy generation and reduce consumption costs.

To achieve optimal performance, the SI required SCADA software products that support Modbus protocol and provide Ethernet connectivity for data acquisition and uploading. The VPN was necessary to transmit data from sub factories to the data center via a secure channel. Similarly, local sites required temporary data storage to prevent data loss during network interruptions. Additionally, the products needed to be based on a flexible and open development platform for seamless integration with the CMMS.

Net Surfing chose Advantech as its sole collaborator because Advantech's solutions are highly integrated for factory energy monitoring management. This attribute enabled Net Surfing to easily complete the bottom layer acquisition and upper layer integration through an open flexible platform with complete communication protocol support. This facilitated the rapid development of the manufacturer's energy monitoring system.

Real-time monitoring and unified management: WebAccess/SCADA

Advantech's solution comprised the ECU-1051TL industrial communication gateway with WISE-Edgelink protocol conversion software, and WebAccess/SCADA remote monitoring software. This easily assembled distributed solution facilitates convenient future expansion. The ECU-1051TL was selected for several reasons. First, it can reliably and securely perform data acquisition and uploading to WISE-EdgeLink. WISE-EdgeLink supports a variety of communication protocols such as Modbus, IEC 60870-104, DNP3, BACnet, and OPC UA. Second, WebAccess/SCADA software enables energy consumption data to be visualized on a computer, smartphone, or tablet in real-time, providing administrators with complete access in data centers or remotely.

The system allowed the eyewear manufacturer to perform in-depth analysis and identify poorly performing equipment due for replacement — thus optimizing production lines. Indeed, energy costs were reduced by 10~15% within a few months. This significant reduction led users to hold this energy monitoring solution in high regard. In the past, conserving energy was difficult as manufacturers could not identify power-hungry equipment. Despite their best intentions, most manufacturers did not know where to start. Using Advantech's cost-effective solutions, Net Surfing quickly developed an energy monitoring system. By utilizing the I4.0 Supervisor energy monitoring system, Net Surfing's gave the factory owners an in-depth understanding of their energy usage. Net Surfing looks forward to collaborating with Advantech again in the future. They intend to bring additional complete energy solutions to the market and work together towards a sustainable future. ∎

# Advantech Builds a Global Water Treatment Ecosystem Around WISE-PaaS 4.0

Having gradually built up an intelligent services ecosystem for water treatment, Advantech collaborated with domain-focused solution integrators (DFSI) to co-create industrial app (I.App) solutions that help accelerate the implementation of intelligent water treatment services in Taiwanese, Southeast Asian, and Indian markets. Advantech utilized the WISE-PaaS 4.0 industrial IoT cloud software platform and WISE-Marketplace I.App store to jointly develop I.Apps with DFSIs. These I.Apps were offered to all partners to encourage the growth of IoT solutions and services.

Photos provided by Advantech
Interview with LF Jacky Chang, Product Manager of Energy and Environment Department, Advantech

This year, Advantech has connected with DFSIs to develop an ecosystem of industrial apps using the WISE-PaaS 4.0 open cloud-native platform. A new strategy is at the core of this initiative: one focus, two directions, three market entry strategies. This strategy is aimed at accelerating the implementation of smart applications in global vertical industries. In quantifying this strategy, LF Jacky Chang, Product Manager of Advantech's Energy and Environment Department stated, "One focus means concentrating on sectors with high-growth applications.
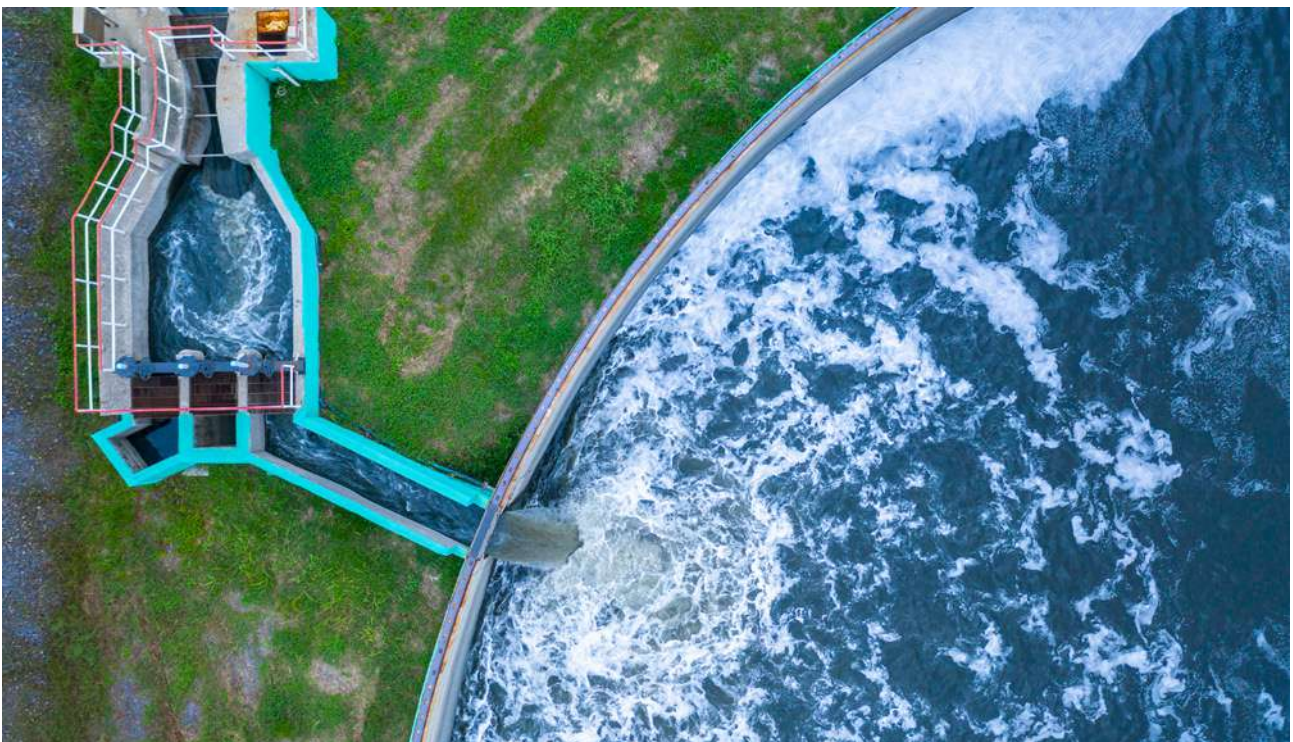
The idea of two directions in this sense is aimed at helping industries promote both digital optimization and digital transformation. Finally, three market entry strategies refers to the implementation of three market entry strategies of: 1) utilizing the WISE-PaaS platform, 2) connecting global DFSIs and software developers, and 3) developing smart applications in at least two markets to prove that solutions are transferrable.

The energy and environment sector covers a wide range of fields and applications with immense environmental differences within each industry's domain — therein lies the challenge when it comes to developing and promoting smart applications. Because of the dissimilarity and complexity of each energy sector, Advantech focuses on high-growth sectors, including water resources and treatment, energy storage, and solar power generation. Among these, Advantech has adopted three market entry strategies in the water resources and water treatment sector to help treatment plants optimize their operations and encourage DFSIs to promote digital transformation.

Accelerating the development of water treatment I.App products and solutions

In terms of the promotion of smart applications in water treatment, Mr. Chang used wastewater as an example. He pointed out that wastewater treatment includes three major processes: biological treatment, coagulation sedimentation, and membrane filtration. In the past, when building an intelligent wastewater treatment system, system integrators (SIs) would develop solutions specifically for these three processes. However, because the equipment used and the environments of the wastewater treatment plants differ from site to site, solutions for one wastewater treatment plant might not be applicable to other plants. This significantly hinders the ability to transfer and promote intelligent wastewater treatment solutions.

To overcome this, Advantech uses its WISE-PaaS platform as a basis to promote strategies of collaboration and co-creation. Mr. Chang further explained that Advantech initially used Cloud Foundry as the framework for WISE-PaaS 3.0, to provide DFSIs with a Platform as a Service (PaaS) solution. Later on, the company changed to Kubernetes (K8s) to develop the WISE-PaaS 4.0 cloud-native platform, which provided three critical application framework services based on flexible container

technology, namely visualization (WISE-PaaS/Dashboard and WISE-PaaS/SaaS Composer), asset performance management (WISE-PaaS/InsightAPM), and artificial intelligence framework services (WISE-PaaS/AIFS). This process enables DFSIs to use these three critical framework services directly to combine with Advantech's Industrial IoT real-time management cloud platform DeviceOn/BI and develop common I.App products (for fast deployment or direct device access) or domain I.App products (for optimized operations management).

Mr. Chang further used the biological treatment process in the wastewater treatment as an example to explain that biological treatment mainly takes place in an anaerobic, anoxic, and aerobic tanks. This treatment process is primarily intended to remove nitrogen and phosphorus content in order to improve water quality. This comprises various detailed operations, such as aeration, sludge recirculation, and nitrified liquid recirculation. Because of the complex processes it proved difficult to develop a solution that could be transferred and applied elsewhere. Currently, by utilizing the WISE-PaaS 4.0 platform, Advantech can decouple biological treatment solutions previously developed for water treatment plants and focus on the three aforementioned processes to repurpose I.App products and then launch them on the WISE-Marketplace for others to use. As a result, DFSIs with development capabilities can purchase multiple I.App products directly from the WISE-Marketplace to develop biological treatment solutions for unique individual scenarios according to individual domain-specific needs. Moreover, DFSIs who lack this development capability can still collaborate with Advantech to co-create solutions.

Connecting with local SIs to expand the global market

While using WISE-PaaS 4.0 to encourage DFSI partners in accelerating the development of I.App products and solutions, the K8s-based WISE-PaaS 4.0 can also be used to provide services with different IaaS solutions, such as Global Azure, Alibaba Cloud, and Inspur Cloud. This achieves I.App interoperability and mobility. Mr. Chang emphasized that the mainstream cloud platform used in each regional market varies from market to market. Therefore, the fact that WISE-PaaS 4.0 can operate on multiple cloud platforms brings significant convenience for collaboration in different

regional markets. This helps promote Advantech's I.App products in different global markets and makes driving SI's I.App innovation more feasible.

Additionally, Advantech has further tightened its collaborative relationships with DFSI partners through joint ventures. For example, Advantech and GSD Technologies Co., Ltd. have established GSD Environmental Technology in a joint venture partnership, combining both companies' resources to develop an intelligent water treatment equipment management system. Advantech also found a DFSI specialized in the water treatment sector to setup a co-creation joint venture (CCJV) with the Industrial Technology Research Institute (ITRI), combining WISE-PaaS 4.0 platform with ITRI's water treatment technology in the development of smart water treatment services. Currently, this DFSI has developed various I.App products for wastewater treatment solutions at various industrial parks and Taiwan Water Corporation's water treatment and purification center. This has allowed the DFSI to pick suitable I.App products according to various domain-specific needs and pack them into a complete solution for that domain, further accelerating the implementation of smart applications in specific sectors.

According to Mr. Chang, with this CCJV DFSI's successful implementation experience in domestic sectors, Advantech is accelerating the expansion of

smart water treatment services in the global market by connecting SI partners in markets in Thailand, Malaysia, India, and across Asia. For example, Advantech signed a Memorandum of Understanding with an SI partner in India in October 2020, while actively searching for collaborative DFSI partners in Thailand and Malaysia to implement smart water treatment applications in several regions.

Mutual benefits for water treatment plants, DFSIs, and Advantech

Mr. Chang concluded that through Advantech's co-creation model with WISE-PaaS 4.0 as the core, DFSIs can quickly replicate applications from one sector to another, while transforming service providers from a purely SI role to one of operations and maintenance services. While accelerating the digital optimization of water treatment plants, DFSIs can also develop an innovative business model through digital transformation, thus creating new opportunities for exponential growth and profit. Advantech will continue promoting the development of smart water treatment solutions, co-creating with partners to our mutual benefit to achieve low carbon emissions in wastewater treatment. This will reinforce the regional services of DFSI, all of Advantech's regional operations, and protect the environment for future generations. ∎
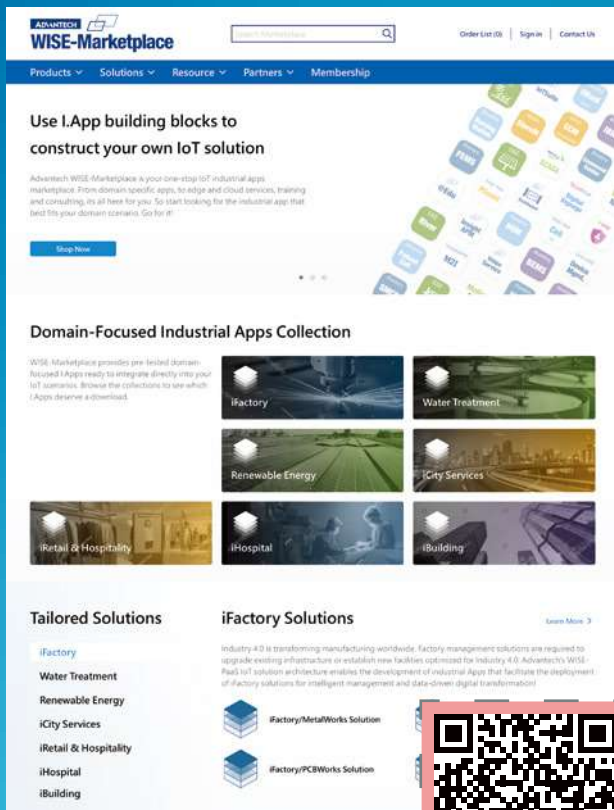
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Advantech WISE-Marketplace is your one-stop AIoT industrial apps marketplace. From domain specific apps, to edge and cloud services, training and consulting, its all here for you. So start looking for the industrial app that best fits your domain scenario. Go for it!

ADVANTECH

Enabling an Intelligent Planet

Featured I.Apps for Advantech Water Treatment Solutions

Water Treat. **On-land**	Water Treat.	Water Treat. **RBMS**	Water Treat. **Submerged**	Water Treat. **IETE**	Water Treat. **Bio Tech**
Water Treat. **Dosing**	Water Treat. **MBR**	Water Treat. **River**	**PIS**	**IoTSuite**	DeviceON **BI**

🔍 **WISE-Marketplace**

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Contact Us

StarTech and Advantech's Collaboration Contributes to Global Sustainability

Startech, an industrial automation and IT integrator based in the UAE, collaborated with Advantech on several vertical environment and energy (E&E) sector markets to develop custom solutions that contribute to a more sustainable planet.

Photos provided by StarTech
Interview with Pagkalavan Ashok, Senior Solution Engineer, StarTech

According to United Nations, the world population could reach 9.7 billion people by 2050 and over 11 billion by 2100. As there are only finite resources that can support the world's population, E&E monitoring has become an increasingly important consideration for countries seeking to achieve sustainable development. Luckily, the twenty-first century has witnessed a rapid growth and advancement of technologies such as IoT, AI, and cloud computing. These developments have made remote central monitoring and many intelligent applications possible in the E&E sector. But, due to this sector's wide range of vertical markets, the development of such applications is often fragmented. This is why Advantech encourages distributors, customers, and suppliers to form an ecosystem — where every partner can complement each other and fill the gaps to co-create

StarTech's SERVICES

SALES & MARKETING

PRODUCT TRAINING

ON SITE SERVICES

TECHNICAL SUPPORT

TESTING, REPAIR & RMA

PROJECT ENGINERRING SUPPORT

innovative solutions that benefit everyone. In the E&E sector, StarTech has worked closely with Advantech for 20 years to promote smart applications and has made many significant contributions to ensuring global sustainability.

Fast-track project deployment by becoming a domain-focused system integrator

StarTech is a one-stop sales and service center for industrial automation equipment, industrial IoT, and IT services in the Gulf Cooperation Council (GCC) countries. With help from world-leading vendors such as Advantech, StarTech's experienced team has been able to meet customer requirements in a range of vertical industries including energy, transport, security, and manufacturing to healthcare, water treatment, oil, and gas. The collaboration between StarTech and Advantech has mainly been on products and solutions such as remote I/O modules, automation computers, intelligent human–machine interfaces (HMIs), embedded solutions, wireless IoT sensing devices, and the WISE-PaaS cloud platform.

During their 20-year partnership, StarTech and Advantech have delivered many intelligent solutions to end customers by utilizing Advantech's software and hardware solutions, as well as the WISE-PaaS cloud platform. This has included building management systems integrated with the heating, ventilation, and air conditioning (HVAC) controllers for GC-32 facilities; waste water recycling systems; and moveable in-bay carwash systems.

Mr. Pagkalavan Ashok, senior solution engineer at StarTech, stated, "Advantech has really put in a lot of effort to enrich their Industrial App (I.App) products in WISE-PaaS, which help customers quickly deploy solutions and allow for customization." Advantech offers VIP membership for WISE-PaaS, which helps the company serve their customers very quickly, and as it is a subscription-based cloud platform, it is easy to purchase directly online. There are many opportunities to use WISE-PaaS in current and future projects.

In order to strengthen the partnership, StarTech has also become one of Advantech's domain-focused system integrators (DFSIs). Mr. Ashok explained, "The DFSI concept is a very attractive business model, within which domain know-how is shared with all partners in different regions around the world. So, if we want to use a total solution from a vertical market that we have no

previous experience in, we can get a solution directly from Advantech without spending time on research and development. For example, an I.App that requires in-depth domain know-how of CNC machines can be obtained from the WISE-PaaS Marketplace website, which also offers I.App products for many other industries."

Winning strategies: customization and industry know-how

Not long ago, StarTech collaborated with both a well-known system integrator based in the US and Advantech to supply several HMI thin client terminals and direct digital control (DDC) units to the Kuwait Oil Corporation to help them monitor and control HVAC units in different onshore facilities. Thanks to Advantech's know-how in the oil and gas industry, StarTech was able to deliver the most comprehensive proof of concept prototype among competitors.

There were nine sites that needed HVAC equipment, all of which were set up to be controlled and monitored using Advantech's TPC-1551T panel-mounted client HMIs. This allowed for each HMI and DDC to be used to configure and control hundreds of edge devices simultaneously eliminating the need for numerous network switches for the project. Special drivers had to be developed to support the customer's requirements, and so Advantech and StarTech engineers worked closely with each other to develop them by leveraging Advantech's extensive expertise to deliver the proof of concept on time.

For this project, StarTech integrated WebAccess/SCADA into the administrative buildings in Kuwait Oil Corporation plants to perform centralized monitoring. This upgrade helped with predictive maintenance, lowered downtime, and the increased the efficiency of their HVAC unit.
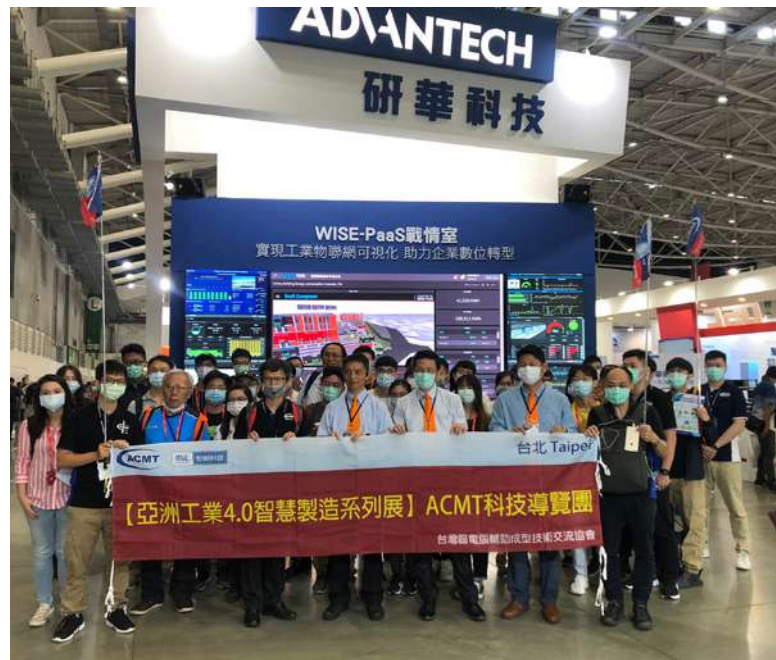
StarTech and Advantech have had a long solid partnership. The managing director of StarTech, Mr. Arman Saffari, views this partnership positively. Indeed, the companies will continue to support each other in future collaborations. Currently, StarTech has several new projects in vertical markets such as facility management, intelligent factories, and smart cities. The company is continuously devoting research and development resources to overcome challenges created by new projects, and ensure a greener smarter planet for future generations. ∎

Advantech Collaborates with Co-Creation Ecosystem Partners to Accelerate the Realization of Industry 4.0

Photos provided by Advantech

In order to help manufacturing industry embrace digital transformation and move toward smart manufacturing, Advantech announced its plan to, "collaborate with industry partners on the co-creation of an IoT industry ecosystem" at the Taipei Automation 2020 trade show. Advantech joined forces with co-creation partners SMA Soft Technology, Dot Zero, Let-Win Technology, HHO Smart, Genesis Power International, Node Health Technology, GSD Technologies, and Goldenwell to integrate domain expertise and exchange software and hardware solutions that enable companies to transition to smart manufacturing.

Mr. Vincent Chang, Senior Manager of Advantech Industrial IoT Group and Marketing Director of Emerging Markets commented, "The COVID-19 pandemic has had a dramatic impact on industries worldwide and many companies have begun to initiate a digital transformation. Manufacturers are implementing intelligent technologies and developing smart applications to reduce costs and improve production efficiency, which should help them maintain a competitive advantage in the post-COVID-19 era."

At the Taipei Automation 2020 trade show, Advantech's solutions were focused on the following three key areas:

- Smart factory: Industry 4.0 situation rooms, intelligent production reports, the Internet of robotic arms, the Internet of CNC machines, smart three-color light sensors, utilization rates, and predictive maintenance.
- Equipment automation: one-stop machine vision, motion control development platforms, automation and production information development, AI-based defect detection, smart factory automatic testing and upgrades.
- Environment and energy: water management, solar power monitoring and management, factory energy management. ∎
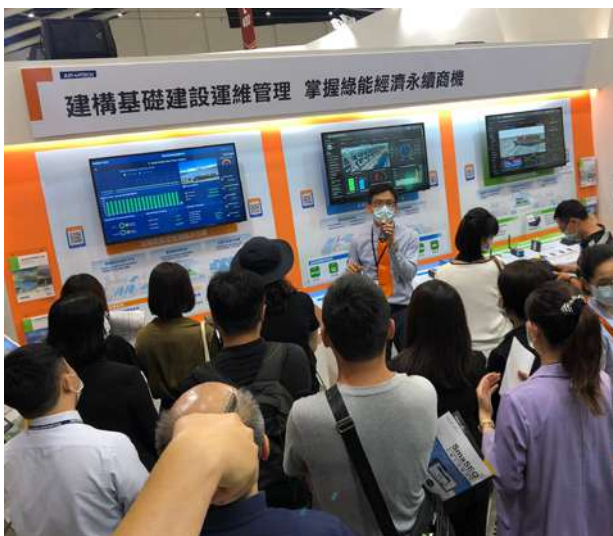
Data Accelerates the Evolution of Smart City

## Wireless Data Collection Establish Intelligence

Leakage Detection

NB-IoT/ LTE-M Base Station

LoRaWAN

Tank Level

NB-IoT

NB-IoT

LTE-M

PH Sensors

Reservoir Water Quality

Water Pressure

LoRaWAN

NB-IoT

LTE-M

Water Meter

Water Level

LTE-M

Valve Control

LoRaWAN

Drainage Flow Control

Facility Health Monitoring

NB-IoT

NB-IoT/ LTE-M Base Station

Hydrometer

ADVANTECH

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Advantech WISE Series Provide Various Data Source Eliminate Obstacle of OT/IT Convergence

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- Support various wireless interfaces and protocols
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- Device to cloud
- One-stop shopping service
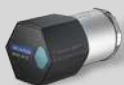
WISE-2410
LoRaWAN Wireless Vibration Sensor

WISE-4671
Advanced NB-IoT/LTE-M IoT Wireless Modular I/O

WISE-4610
LoRaWAN IoT Wireless Modular I/O

WISE-6610
Hardened LoRaWAN 8-Channel Gateway

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