

# Paving the way for an energy smart business

Elitegroup Computer Systems, Intel, and Tatung collaborate to pioneer an intelligent gateway solution that promotes energy conservation among businesses in Taiwan



Established in 1987, Elitegroup Computer Systems (ECS) is an original design manufacturing (ODM) company that produces motherboards, desktops, notebook computers, graphics cards, and mobile products. Committed to developing innovative products that not only elevate today's way of living but also promote environment-friendly practices, ECS collaborated with Intel and system integration services company Tatung to develop an Internet of Things (IoT) application that brings smart energy savings to businesses.

## Challenges

- **Reduce energy consumption.** Cut building-wide energy consumption to align with the government initiative to improve energy efficiency among businesses.
- **Convert different communication interfaces and protocols.** Enable smooth conversion of different protocols and communication interfaces from a wide variety of devices and equipment in the building.
- **Enable seamless building automation.** Develop a smart energy conservation system that is efficient and reliable in data collection and control command transmission.

## Solution

- **Develop green building concept.** Improve energy efficiency by integrating old and new equipment in the building to achieve significant energy savings.
- **Build intelligent gateway solution.** Utilize Intel® Quark™ SoC X1000 to develop an intelligent, automatically controlled framework that provides low-power, high-performance computing for connecting legacy and new systems while enabling seamless and secure data flow between edge devices and the cloud.

## Technology Results

- **Integrated legacy devices and equipment.** Successfully integrated a wide variety of legacy devices and equipment through an intelligent gateway and management system to form a smart building solution.

## Business Value

- **Less wasted power.** Using Tatung's Smart Meter\* and Smart Energy Management System\* (SEMS\*), efficiently monitor real-time power consumption data to control power usage, save on energy, and reduce carbon emissions.
- **Significant energy savings.** ECS expects energy savings between 20 and 30 percent per year using the energy conservation system.
- **Turnkey solution for both office and home use.** The pioneer energy saving solution can be extended to other applications to help communities around the world use smart gateways for conserving energy while reducing maintenance costs on managing devices and appliances.

"Intel® technology- based intelligent gateway helped us acquire the intelligence we needed to drive a new energy efficient building design. With our intelligent gateway, which integrates the powerful core technology of the Intel® Quark™ SoC X1000-based Intel® IoT Gateway and Tatung's outstanding software scheme and system integration, we are able to develop an energy conservation system that can lay the foundation for future energy-efficient office spaces."

– Wen-Yen K. Lin  
Chairperson of ECS and  
President of Tatung

# Intel® Quark™ SoC X1000-based intelligent gateway solutions bring a huge positive impact on global energy savings

“By implementing the smart concept into our old building, we are able to efficiently monitor our power usage through building automation and save on energy significantly.”

– Edward Liu  
Vice president of  
ODM Business Unit at ECS

## Creating a more energy efficient business environment

The Taiwan government has set its sights on harnessing renewable energy to account for 15 percent of the country's power usage by the year 2025. To achieve this goal, the government currently implements the Energy Management Law, which encourages companies to practice energy efficient business operations. In compliance with this initiative, many domestic companies have begun relying on solar energy, which is expected to produce an estimated 1.2 billion kilowatt hours of electricity by 2025.

ECS has also adopted energy efficient business practices. It came up with the green building concept, which aims to help office buildings in Taiwan reduce power usage. To date, about 97 percent of all buildings in the country are old infrastructures that will need a huge budget to be converted into energy efficient buildings. To make this affordable, ECS needed a solution that could effectively integrate the old and new equipment in a building to conserve energy. Through this solution, ECS also hopes to promote building automation to effectively monitor power consumption.

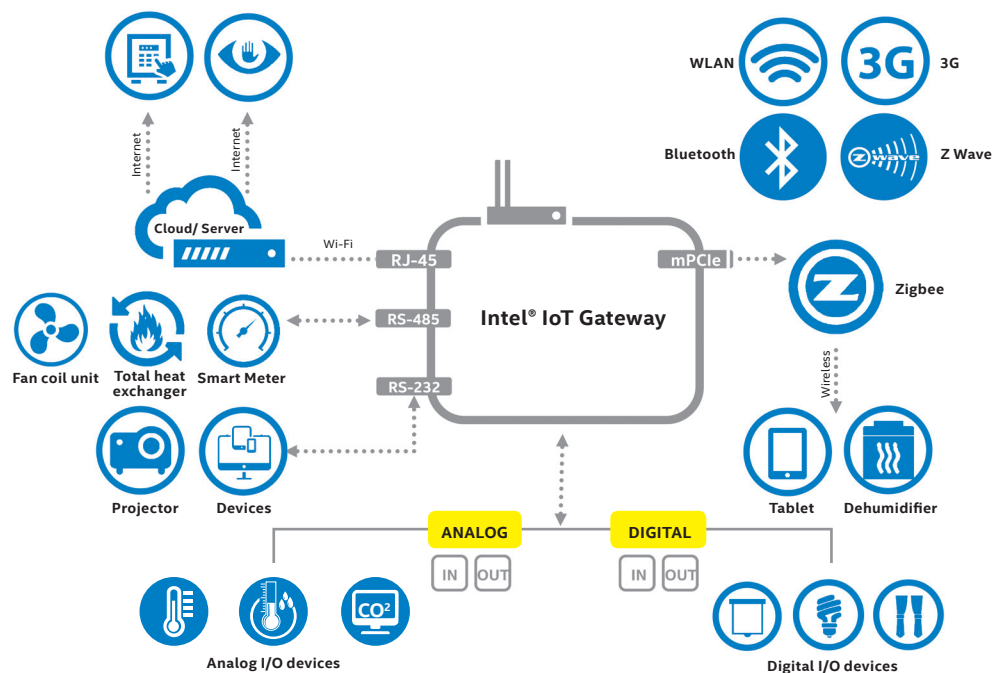
## Three-way cooperation for a visionary energy conservation project

To bring its green building concept to fruition, ECS worked with Intel and Tatung on a turnkey solution that will effectively enable energy efficiency among office buildings in Taiwan.

ECS chose to collaborate with Intel because of the powerful core technology it offers for building intelligent gateways. Most of the ODMs in the industry are already familiar with Intel® architecture. The Intel processor-based intelligent gateway provides intelligent connectivity to help ODMs and software companies deploy solutions seamlessly without replacing their existing infrastructures.

For system integration, ECS turned to Tatung for its superior software scheme and system integration solution, which also works seamlessly with Intel architecture, helping reduce development costs and maintenance effort.

The three-way collaboration produced an intelligent gateway solution that was the first deployment of its kind in the Asia-Pacific region.



The intelligent gateway architecture

## Connecting legacy devices with a smart gateway

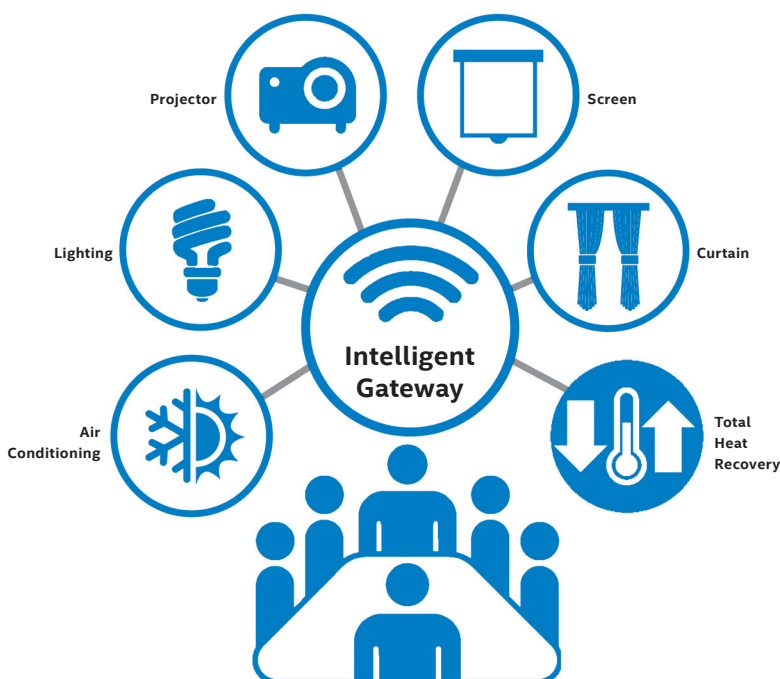
The intelligent gateway solution integrates Intel Quark SoC X1000 and Tatung's SEMS to develop a smart connection between energy management systems and other equipment and devices. It collects environment information from different types of devices and sensors and then sends the control commands to these devices. It also facilitates communication between different devices, enabling seamless transmission of different protocols to different interfaces and devices. The whole process is conducted on the cloud; there is no need for traditional human operations.

For the first step of the project, the gateway was implemented in ECS's meeting room, integrating the conference reservation system, handheld devices, the lighting system, projection equipment, office furniture, and the air-conditioning system. ECS performs data mining on the data collected from the gateway to find out how the resources are used or what adjustments are made by users to better understand usage models and optimize the system to match user behavior.

"Each meeting room has different profiles for different types of meetings," explained Edward Liu, vice president of the ODM Business Unit at ECS. "Some users may adjust the setting away from the default settings in the profile. Through data mining, we were able to analyze the data and change the pattern, setup, or parameters preferred by users—for example, their preferred lighting level."

The intelligent gateway uses Intel Quark SoC X1000, which is supported by software components—including McAfee Embedded Control\* and the Wind River Intelligent Device Platform\*—to securely aggregate, filter, and share data from edge devices to the cloud. The gateway includes the I/O board to enable a flexible connection between the devices.

"For a general-purpose gateway, the Intel Quark SoC X1000 main board meets most of the requirements," shared Eric Chen, general manager of IoT Business Division, Smart Grid BU, at Tatung. "But for specific purposes, the I/O board provides both the digital and analog I/O, which offers a more flexible gateway solution for connecting our devices." To enable energy savings, the intelligent gateway



The intelligent gateway is implemented in ECS's meeting room

## Lessons Learned

- Office buildings consume more energy than any other infrastructure. By adopting energy-efficient practices, offices can provide a huge impact on global energy savings.
- Meeting or conference rooms are the easiest places to convert into energy efficient spaces.
- The Intel® IoT Gateway enables the integration of a wide variety of legacy and modern devices and turns an existing building into an energy-efficient, smart building.
- Intel has a full scope of gateway solutions to help ODMs, software companies, and system integrators seamlessly deploy an intelligent and secure solution and reduce their development cost and maintenance effort.

uses Tatung's SEMS, which monitors the power consumption data so that power consumption levels can be controlled for energy conservation and carbon reduction. Added Liu, "At the end of a meeting, all power settings will return to the original state to avoid wasting power."

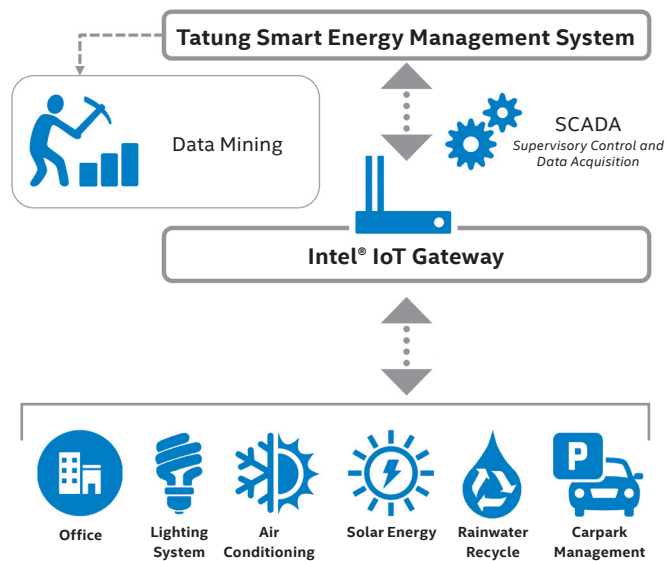
ECS has extended the solution to other parts of its building. Since the solution is non-invasive, ECS was able to build on its capabilities to extend the functions of its other devices and equipment.

### A cost-efficient energy conservation system

With the deployment of the intelligent gateway solution, ECS expects to save about 8 percent in power usage for the first year. As the solution continues to enhance overall efficiency, ECS expects to achieve around 20 to 30 percent in energy savings per year. It will also cut maintenance costs with the Intelligent Gateway's ability to reduce the time spent on building maintenance.

### The link to an energy-efficient business environment

After completing the intelligent gateway deployment in ECS, Tatung will deploy the solution in its own office building. Both companies aim to serve as role models for other businesses in Taiwan so that energy efficiency can be implemented more effectively in the business sector.



### Intelligent Gateway system has been expanded to other parts of the ECS building

"With this solution, Taiwan can become a pioneer in using future intelligent architecture to realize the smart building concept. As a flexible solution, the intelligent gateway can be expanded to many different applications like factories, schools, hospitals, and public area management. It not only makes physical life more convenient and smart, it also makes energy conservation intelligent for a more energy-efficient future," concluded Wen-Yen K. Lin, chairperson of ECS and president of Tatung.

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