

# IoT enables smart energy management by Kingspan

Kingspan deploys the Intel® IoT Gateway built on the Intel® Quark™ SoC to create an energy management solution that is helping to transform its headquarters into a net-zero energy building



Having built its business on providing energy-efficiency solutions that help create a more sustainable built environment, Kingspan is using the Intel® IoT Gateway to create a smart energy management solution that has already helped it achieve ISO 50001 accreditation and is contributing towards the transformation of its headquarters in Ireland into a net-zero energy building.

## Challenge

- **Smarter solutions.** Kingspan wanted to use its range of energy-efficiency solutions, integrated into an Internet of Things (IoT) platform in which data from sensors could be gathered, collated, filtered, and analyzed, to transform its headquarters
- **Carbon reduction.** Kingspan also wanted to become a net-zero energy organization and needed the data to prove results to energy-management accreditation agencies and to customers as the basis of a commercially available solution
- **Consumerized IT.** Driven by the consumerization of IT, Kingspan's customers were increasingly demanding timely, actionable data about energy consumption in flexible, usable formats

## Solution

- **Intelligent gateway.** Kingspan deployed the Intel® IoT Gateway to seamlessly interconnect its industrial devices and secure data flow between them
- **Secure data platform.** The Intel IoT Gateway was developed using the Intel® DK100 Series Development Kit, which is optimized for industrial and energy applications and can help maintain interoperability between new intelligent infrastructure and legacy systems
- **Small-core processing.** The Intel IoT Gateway is designed using the Intel Quark SoC X1020D, which has the performance, form factor, security, and manageability required in the industrial and energy market segments

## Impact

- **Commercial IoT proposition.** Kingspan has demonstrated the possibilities and the power of the IoT in the energy and construction market segments and has a proven commercial proposition for its customers
- **Net-zero energy building.** The Kingspan headquarters now generates one-third more energy than it consumes and has achieved ISO 50001 accreditation using data gathered through the Intel IoT Gateway

## Sustainable buildings and energy management with the Intel® IoT Gateway



“The Intel® Quark™ SoC and Intel® IoT Gateway have the features and functionality that we needed: stability, security, speed, and manageability. But we get more than that with Intel – we get a scalable, fully interoperable solution built on Intel® architecture from its core to its edge.”

*John Shaw,  
CIO,  
Kingspan*

### **The Internet of Things: An IT revolution**

“There’s a revolution going on in IT right now,” says John Shaw, CIO of the Kingspan Group, one of Ireland’s largest publicly listed companies. “The cloud, big data, the IoT, and IT consumerization are all transforming businesses. And our industry is right at the heart of it. It’s an exciting place to be.”

Kingspan’s history is in the manufacture of insulated panels for the construction industry, but today that is only one element of its current business. The company now has a much broader goal: to create a more sustainable built environment through more efficient use of energy, water, and other resources. In addition to the insulation solutions on which it built its business, the company now offers solar photovoltaic (PV) solutions, solar thermal systems, micro-wind generation, and fuel storage among many others.

### **Smart buildings: Where IT trends come together**

Many of Kingspan’s products already incorporate a smart layer that uses built-in sensors to gather data about the buildings in which they are installed. In Shaw’s view, this is where the big trends in IT come together.

“First of all, the consumerization of IT has created an environment in which customers rightly expect the same kind of timely, actionable data, made available through a flexible medium,” he says. “In that sense, energy consumption information is no different from any other aspect of their professional and personal lives. That inevitably requires

some form of cloud infrastructure to process, store, and analyze data sets coming in. That’s the second big trend we see.

“The third element is IoT,” he continues. “Customers actually want a series of interconnected devices that can communicate with each other, share and manage data, and provide insight and information that will deliver much greater efficiencies in the long run, making Kingspan products autonomous. Our challenge – and our opportunity – was to build that IoT capability into our solutions and provide a complete, end-to-end solution to customers.”

### **Data to demonstrate the art of the possible**

While considering how best to serve its customers, Kingspan also initiated a program to achieve net-zero energy status for the whole company. By using its own products and solutions, the company wanted each of its sites to generate more energy than it consumes. “This company is about the art of the possible,” says Shaw. “We knew we could be our own best customer and demonstrate exactly what could be achieved by implementing our own solutions.”

Kingspan’s plans for transforming itself into a net-zero energy business began with its head office and innovation center at Kingscourt in County Cavan, Republic of Ireland. It installed a full spectrum of its own sustainable building solutions including Kingspan insulated panels, integrated solar PV, intelligent LED lighting, electric vehicle charging, and rainwater harvesting with plans to add micro-wind generation.

By using its own products, Kingspan also had a number of data-gathering sensors in place. However, the company needed these sensors to communicate with each other and, crucially, to download and analyze data being gathered over time. The company needed a data gateway that could securely aggregate, share, and filter data coming in from multiple sources and then transmit and store it via the cloud for analysis.

“Data consolidation, management, and analysis were the missing links,” says Shaw. “Like everything else, sustainable building management and resource management need to be measured if they are to be managed effectively. We also needed that data to prove that our products really deliver energy, cost, and carbon savings – both to our potential customers and to relevant regulators and standards bodies.”

### The Intel IoT Gateway

Kingspan turned to Intel to develop a proof of concept to use in its headquarters, with a long-term view to develop a commercial solution that would be available to customers.

The solution that Intel developed with Kingspan is built on the Intel DK100 Series Development Kit. It is designed using Intel Quark SoC X1020D, which has been developed specifically to seamlessly interconnect industrial and other devices and to secure the data flow between them and the cloud.

Its compute capabilities, small form factor, and low power consumption mean that a gateway built on the Intel Quark SoC is ideal for thermally constrained, fanless, and headless applications such as Kingspan's energy management solution for its headquarters.

As Shaw explains, “The Intel Quark SoC and the Intel IoT Gateway have the features and functionality that we

needed: stability, security, speed, and manageability. But we get more than that with Intel – we get a scalable, fully interoperable solution built on Intel® architecture from its core to its edge.

“What also became clear as soon as we sat down with the Intel team was that this was a company with a vision of an IT-enabled future that chimes with our own and has a clear roadmap for getting there. Collaborating with like-minded people has been both exhilarating and extremely productive. We can trust Intel to deliver, which means we can also gain the trust of our customers as we move into this new area.”

### The IoT realized

The Intel IoT Gateway was initially deployed to monitor three-phase voltage on the solar panels installed at Kingspan's headquarters, with data from other devices and equipment added over time. The data gathered is securely transmitted to the cloud and from there to company's own internal database.

“Once we had made the decision to implement the Intel IoT Gateway, installation was very quick. It was the simplest, fastest solution we found,” says Shaw. “The Intel team showed the same agile, can-do, and entrepreneurial spirit that we have at Kingspan, so we got a result delivered in days.”

The Intel IoT Gateway is a key element in Kingspan's fully automated energy management system, and it will help the company to demonstrate progress on achieving its net-zero energy goals. Using data gathered and analyzed by the Intel IoT Gateway, Kingspan was able to prove that it generates approximately one-third more electricity than it consumes. The data has also helped it achieve ISO 50001 accreditation for energy management.

### Spotlight on Kingspan

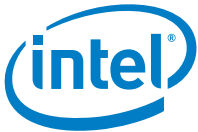
Kingspan's business is expanding rapidly to meet global demand for sustainable, smart, and energy-efficient building solutions. The company has 120 locations worldwide, including 62 factories. It employs more than 7,000 people in more than 85 counties and is present on six continents. Approximately one-third of its business comes from Ireland and Britain, a third is from the rest of Europe, and the final third from North America, the Middle East and Asia. Its most recently published annual turnover exceeded USD2.12 billion (EUR1.7 billion).

"It is an elegant, automated solution that impressed our ISO50001 assessors as much as our internal stakeholders," explains Shaw. "With the insight gained from our data, we can identify areas for further savings and continuous improvements – and prove categorically to our clients that our solutions deliver the results they are looking for."

Shaw is also convinced that the IoT offers huge opportunities outside Kingspan's energy management field. "I believe the Intel Quark SoC is an absolute game changer," he says. "There is a huge appetite for what we are doing and a significant commercial opportunity. In a few short years, half of all industrial devices will be connected computing devices at the edge. Whenever I speak to CEOs about what we have achieved at Kingspan they start looking for ways IoT could be deployed in their own businesses. This is just the start."

Intel's vice president and general manager of EMEA, Christian Morales, is equally optimistic about the opportunity that IoT offers for expanding into new markets: "Intel is delighted to work with a company like Kingspan who is developing smart-energy building solutions for its customers. The combination of Kingspan's long history and expert knowledge in the field of energy-efficient building products, coupled with Intel's leading-edge technology for securely and accurately monitoring energy usage data from its products, provides compelling new solutions to help customers reduce both their energy costs and carbon footprint."

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