Utility GIS Meets Infrastructure, Customer Needs for Ireland's Electricity Distribution System

ESB Networks

Republic of Ireland

Infrastructure is critical to an electric utility company – not only the physical infrastructure of the grid, but also the information technologies (IT) that help a company plan, design, operate, and maintain its network assets. The older and more outdated IT systems and infrastructure become, the greater the threat to power delivery, field crew safety, and customer satisfaction.

This was the challenge for ESB Networks Ltd., the licensed operator of the electricity distribution system in the Republic of Ireland. ESB Networks relied on a highly bespoke geographic information system (GIS) solution from Hexagon's Safety & Infrastructure division to meet the daily workflows required by users. While it served the company well for years, the 25-year-old system was no longer supported, and was hosted on aging IT infrastructure.

Because ESB Networks is responsible for managing 160,000 kilometers (nearly 100,000 miles) of electricity network and serves more than 2 million customers, these legacy technologies posed a risk to the delivery of core business functions and services.

"A GIS system that accurately records our network is critical to our asset management," said Marguerite Sayers, managing director of ESB Networks. "It's critical to the safety of our staff. And it's also critical for public safety."

To mitigate against this risk and satisfy business requirements, ESB Networks undertook an ambitious program to implement a new GIS solution and comprehensively integrate it with corporate IT systems and infrastructure.

A Single Enterprise Solution

Following a highly competitive procurement process, ESB Networks contracted with Hexagon and its partner, Irish Mapping & GIS Solution Ltd. (IMGS), to deliver an advanced utility GIS solution. The technology enables operators to maintain a source of reliable, location-based information about utility networks and their connectivity and share these definitive records with users and systems across the enterprise.

ESB Networks needed a solution that would continue to meet its specific and complex workflows, while also expanding and enhancing functionality to future-proof business requirements.

"The key remit of the solution we were to install was that it wouldn't have any negative or adverse effects on our business processes," said Christian Beausang, functional lead and support. "We were prepared to change the product, rather than our business."

Hexagon worked for three years to implement and deploy the system on ESB's corporate IT infrastructure before going live in 2015. The team also deployed Hexagon's electricity data model, with geospatial data stored in Oracle Locator, as well as additional customizations to meet the same advanced business workflows configured in the legacy systems. The system now serves as a single enterprise solution for the full life-cycle management of ESB Networks' network assets, improving the workflows and efficiency of a host of company activities and operations.

Simplified Network & Services Maintenance

Approximately 1,000 staff members across ESB Networks' businesses use Hexagon's system, which enables the company to manage its network in three views simultaneously: geographic, geo-schematic, and ortho-schematic.

Two main applications within the suite are integral to helping the utility company's network operate as smoothly and efficiently as possible. One component, accessed by more than 150 users, replaced two different legacy applications and is used by staff responsible for designing and maintaining the electricity network model, which also supports other business activities, such as network planning, site and easement acquisition, and data capture. Another application provides view/read-only web access to network and asset data and is accessed by more than 850 ESB users.

"These applications allow us to design our network and keep accurate records of our asset database while also giving external people – contractors – access to the network," Sayers said.

Seamless Integration with Other Systems

The network model is the foundation for many of ESB Networks' applications and business processes. Twelve sources of third-party data must be loaded into the system and kept current. To achieve this, the solution takes a "best-of-breed" approach by leveraging the latest in web services technologies.

"Not only do we have to be sure we're capturing the right data for the GIS, we have to make sure we're capturing the right data for all of the down-line business applications," said Beausang. "We've now moved to a more modern GIS, which has the modern capability to allow us to drive greater efficiency into our business."

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Functional Lead & Support
ESB Networks

One such area is outage management. Any changes in the GIS are live in the OMS within 24 hours. Derek Hynes, operations manager, said this feature benefits the utility's field operations.

"It allows us to have a lot of confidence that the real-time state of the network in the system is accurate compared to what's on the ground," Hynes said.

Hynes believes this comprehensive approach is a differentiator.

"The whole suite of systems has been integrated together," he said. "The packaging of all these different parts into a holistic, whole unit stands out against other utilities."

Safety First for Field Crews

Worker safety is an important consideration for the company. ESB Networks has a very distributed workforce, with 34 different offices. Each day, ESB Networks' crews and contractors cut timber, pole, dig underground, engage in construction, and more. All these teams need accurate, up-to-date information about the location of assets and their work.

"The GIS system helps us see exactly what is going on in real time on our networks," said Engineering Officer Shane O'Neill. "It makes us a safer and better company. Everyone knows exactly what they're doing, and that they're doing it safely, every time."

With this strong foundation in place, ESB Networks can support a number of important efforts, whether a public-facing "Dial Before You Dig" website or SIRO, a corporate joint venture with Vodafone to deliver high-speed broadband to customers using ESB Networks' assets. In addition to the core Hexagon system, the SIRO solution includes Hexagon's component for fiber network management.

"It's opened up a whole new possibility in relation to using our existing networks," said O'Neill. "Being able to record that as a layer on top of our existing network is huge. Whether it's our own network or the new fiber network on our existing structures, we're aware of where it is and how it's working."

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A Model for Growth

Technology is rapidly changing, which creates significant challenges for power generation, transmission, and delivery organizations. ESB Networks has embraced this change – exploring automation and the integration of renewables and storage into the grid – to improve its service delivery and customer satisfaction. In fact, it has been recognized as a global leader in the use of smart grid technologies, and its GIS project has been recognized at home, winning an award from the Irish Organization for Geographic Information for best public sector application.

"We are a regulated monopoly, so value for money for customers is huge for us," said Sayers. "We're constantly looking for improved efficiencies. The company's GIS solution is crucial to these efforts as accurate records inform decision-making. Our GIS system and our relationship with Hexagon is core to making sure we can deliver on all of that."