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Bjarne Korshøj
Plant Manager

Wonderware Helps Elsam A/S Shed Light on Opportunities to Improve Production and Performance Management

Fredericia, Denmark - When thousands of people are relying on you for their light and heat, you can't interrupt their service to address anything but the most urgent issues. And yet, as conditions change and demand fluctuates, utility companies must be prepared to respond in real time, or run the risk of leaving their customers — quite literally — in the dark. This is exactly the situation faced by Elsam A/S, Denmark's largest provider of electricity and heat.

Power generation in Denmark can be complex and expensive. Geographical and political factors dictate that there is no nuclear or hydroelectric power. Therefore, electricity must be generated by burning coal, natural gas, oil or straw, or by harnessing the wind. Elsam uses all of these methods and operates eight major power facilities, hundreds of wind turbines and a number of small local power units to meet its customers' needs.

The need to more effectively manage production and capacity from all of these facilities became urgent when Denmark's government deregulated the power market in 2000. To address these increased challenges, Elsam implemented a production and performance management software solution from Wonderware, a business unit of Invensys. The new Wonderware solution empowers Elsam to centralize control and thus more tightly manage production.

Elsam Engineering, one of the power utility's subsidiaries, performs this centralized control function. Based in Fredericia, on Denmark's Jutland Peninsula, Elsam Engineering collects production data directly from each power generation plant, marries it to demand and then instructs the plants on how much power needs to be produced to meet customer demand.



"As an engineering company specializing in energy and environment, Elsam Engineering focuses on providing sustainable energy solutions to our customers," said Kim Lantz, Elsam Engineering business manager. "With production and performance management tools provided by Wonderware, we are able to provide Elsam A/S with a solution that significantly improves its overall business processes."



Elsam worker in Control Room

The system Elsam deployed is called OSVALD, and is based on Wonderware's IndustrialSQL Server, InTouch, ActiveFactory and the Industrial Application Server software tools. Built on the Microsoft .NET platform, OSVALD sits in the central load-sharing control room, collects current data from each of Elsam's eight major power plants, ELTRA — the transmission system operator — and the smaller local power units.

Wonderware's industry-leading IndustrialSQL Server real-time plant historian is based on Microsoft's SQL Server technology. It collects and stores data from thousands of I/O points in each of the power plants in one central database, providing a single point of access to all vital information needed to drive daily decision-making. By using the statistical information gathered over time, together with current production information analyzed in ActiveFactory trending and analysis software, Elsam can instruct certain plants to raise production or lower production as required to meet fluctuating customer demand. InTouch HMI software provides the machine visualization and control for plant operations.

Lars Kruse is a control engineer who works in the Elsam Control room where he assesses the power needs for the coming day, issues bids on the open market to cover shortfalls and sells extra-capacity and, when the bids are received, creates a production plan. The plan is then switched to the production station where it is transmitted to each of the power plants.

Production is then monitored throughout the day to make sure it meets the plan. When production falls off target, an alarm sounds and then users like Kruse can restore the balance in a matter of minutes either by generating more power, buying it from other vendors on the open market or selling off excess power.

"OSVALD enables us to send regulation orders directly to the plants, which really cuts the delay times associated with response," Kruse said. "Now we can regulate power production much more rapidly than before."

Reliability Is Critical

Prior to the rollout of the Wonderware production and performance management solution, Elsam Engineering relied on an old SCADA system.

"We needed a more open and flexible system than we had before," Bjarne Korshøj, Elsam Engineering's plant manager, said. "And, above all, we needed a high level of reliability. Production never stops. We have to be able to consistently deliver power or the lights go out. So it's incredibly important to have a high level of availability.

"Flexibility was also critical," he added. "We knew the use of the system would change, as we evolve and modernize to remain competitive, although we didn't know how. We couldn't foresee all the things the system would need to do and what other plant systems would need access to the data. Competitive products for this industry were not flexible and were expensive. Yet Wonderware's comprehensive production and performance management tools meet all of Elsam's requirements."

This demand for flexibility is one of the primary reasons Elsam has standardized on Microsoft-based technologies, including the .NET framework, rather than competing UNIX-based products.

The OSVALD provides Elsam with an open, highly flexible platform that can evolve and adapt to the company's changing needs as it goes forward. It also delivers the real-time communications protocol that is crucial to Elsam's ability to react to minute-by-minute changes in the market to eliminate the costs associated with generating too much power, or having to buy power at a premium on the open market to cover a shortfall.

"The new system has had a profound impact on the way we operate," said Korshøj. "In this business, key factors change all the time. When someone switches on a light, they instantly create a demand for enough energy to power that light and we have to be able to respond to that. The new system gives us the flexibility to do that."

ArchestrA Technology Extends Control

Developed with an underlying platform of Microsoft .NET and built on the ArchestrA architecture, the Wonderware Industrial Application Server provides an infrastructure for simplifying the development, deployment, maintenance and administration of distributed automation systems. This provides a new tier of real-time data acquisition, alarm and event management and collaborative engineering capabilities.

"Wonderware's production and performance management tools provide a cost-effective system that is very fast, offers the reliability we need, and provides the flexibility to take us where we may need to go in the future," Korshøj said. "It delivers all the things Elsam was looking for when we started the process of upgrading our control systems in 1999."

Generating power is an expensive proposition and increasing price fluctuation meant that it was more important than ever to produce just what is needed, and when it is needed. This is complicated by the fact that it can take the better part of a day to get a plant in shutdown mode up and running to respond to unanticipated demand. By getting the load-sharing balance correct between the different plants, Elsam is able to save money and reduce pollution.

With the high level of reliability, flexibility and portability delivered by Wonderware, Elsam is moving forward with unprecedented control over its production processes. Not only does it have a newfound ability to respond to market conditions and drive excess costs out of the business, it is doing so with the confidence that the lights will not go out in Denmark.



Elsam generates electricity by burning coal



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