

The pulp mill that became a major energy supplier System 800xA helps Södra Cell Värö sell electricity, district heating and biofuels to local and national users



Södra Cell Värö is a paper pulp plant on the west coast of Sweden that has undergone an enormous transition during recent years. As well as manufacturing high-quality pulp, the facility now supplies the neighboring town of Varberg with electricity, district heating and biofuels. ABB's System 800xA automation platform, which is utilized throughout the mill, is instrumental in helping Södra Cell's operators optimize the efficiency of the plant's many processes and supply surplus energy to Varberg's inhabitants and businesses.

Södra Cell is one of the world's leading manufacturers of paper pulp. Using its extensive knowledge of paper's key component – cellulose fiber – the company sells pulp and related services to the open paper manufacturing market.

Södra Cell Värö, one of Södra Cell's five pulp mills, has 350 employees and produces 425,000 tonnes of high-quality chlorine-free softwood pulp per year. Ten years ago it was just a paper pulp company. Today it can rightly call itself an energy company.

Conscious energy strategy of innovation and investment

The pulp-making process generates great quantities of energy and the fact that Södra Cell Värö now utilizes the surplus production is a result of a conscious energy strategy. The foundation of this strategy was an investment in more energy-efficient equipment as well as control solutions to optimize energy production. Practically all the plant's processes have been reviewed and refined to increase their energy efficiency.

“Over the last few years we have invested more in measures to save energy than to increase production. In total, nearly two billion Swedish crowns (SEK) or approximately 300 million USD”, says Ola Walin, Maintenance Manager at Södra Cell Värö.

“A more energy-effective operation has given the company completely new revenue streams”

Ola Walin, Maintenance Manager, Södra Cell Värö.

System 800xA helps operators optimize energy use

As a tool to control and coordinate its processes, Södra Cell Värö uses ABB’s extended automation platform System 800xA. This control system is at the heart of the entire facility, gathering, processing and presenting information from all process areas. It gives operators a clear and easy-to-understand overview of what is required to plan, supervise and optimize pulp production in the most energy-efficient way possible.

“ABB supplied control systems for all our processes. These are connected in a common user interface where we can control and follow up what happens in the different parts of the operation. I would say that ABB is involved in every project”, continues Ola Walin.

System 800xA helped Södra Cell transform its Värö pulp plant from being a major consumer of electricity and fuel oil to becoming so efficient that the energy left over can instead be sold as electricity, district heating and biofuels. District heating customers include the nearby town of Varberg, whose steadily growing population has now reached around 58,000. Biofuels are sold to utility providers in cities like Stockholm and Örebro.

‘Carbon credits’ started the ball rolling

“Södra Cell Värö started supplying district heating to Varberg municipality around 2001 when green electricity certificates and carbon dioxide allowances – carbon credits – were introduced”, Ola Walin continues. “With green certificates, investments in technology that increased electrical production became easier to recoup. It was a way of both providing a social benefit and ensuring that our own processes did not become too expensive”.

1. The central control room of the Värö mill with System 800xA operator work places supervising the entire pulp plant. | 2. Ola Walin, Maintenance Manager at Södra Cell Värö, says that System 800xA’s common control interface helps operators optimize the production of surplus energy from the pulp manufacturing process. | 3. Cellulose has great potential. To make the most of it, Södra Cell is investing considerable resources in product development and research. | 4. The Södra Cell Värö pulp mill sells electricity to Sweden’s national grid. This is just one of several new revenue streams.



Today, the heat from the mill's wastewater and that recovered from the boiler's flue gases almost meet Varberg's entire district heating demands. After additional investments in its power generating capabilities, the plant also supplies electricity to Sweden's national grid. Södra Cell Värö will soon probably be the world's first pulp mill to be independent of fossil fuels for its day-to-day operation.

Bark becomes biofuel

"The whole pulp industry has undergone a major transformation in recent years", notes Hans Stenberg, Client Manager for Södra Cell at ABB. "Electricity and district heating sales have become an increasingly important part of company operations. One result of this change can be seen in the recovery boiler where the lignin, which is released when the pulp is cooked, is burnt and converted to heating energy. This operation has now been optimized to harvest more energy, both from the boiler and from the flue gases that are created".

A new turbine that generates more electricity is another example. Södra Cell has also reduced the consumption of heat with more energy-efficient equipment. Even biofuel is in demand, so a dryer was recently commissioned to dry bark, which is then sold on as biofuel to local power stations.

Future investments planned

Cellulose is a material with many possibilities. To realize these, Södra Cell is investing considerable resources in product development and research. Investments in future energy supplies are part of these plans, including a new pellet production facility, a new lime kiln for making the mill independent of fossil fuels, plus the erection of three wind-power turbines.

Summary

Södra Cell Värö is one of the pulp mills that has gone furthest in the transformation from a traditional high energy-consuming manufacturer to a net energy supplier, and process control from ABB's System 800xA has been instrumental in helping operators optimize the production of surplus energy.

"Although pulp production is still central to the mill's operations, the swing towards a more energy effective operation offers new impulses and opportunities", states Ola Walin. "It has given us completely new revenue streams and strong competitiveness, at the same time as we contribute to improved social conditions and a better environment".

ABB's delivery to Södra Cell Värö

System 800xA is utilized throughout the mill for control and monitoring. The mill has also invested in an 800xA Simulator for training operators and maintenance engineers. Södra Cell Värö has specified that premium efficient IE3 motors from ABB shall be used in all applications throughout the entire mill.

Some data of the automation system used:

- Process control: Extended Automation System 800xA
- Number and type of controllers: 32 AC 450, 6 AC 800M
- Total number of I/O signals: 23,000
- Number of operator workplaces: 56
- 800xA Simulator including AC 800M soft controllers.
- Engineering and commissioning of the automation system and the simulator by ABB



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