

System 800xA

NBE Sweden is squeezing ethanol out of wood



Already back in the 1990's – long before climate issues rose to the top of the political agenda – far-sighted industrialists and politicians in the Härjedalen province in Sweden started to discuss the possibility of producing industrial ethanol from forestry products. One of the reasons for this was the fact that there is already a biofuel industry in Sveg; Härjedalens Miljöbränsle AB, which produces pellets and briquettes from wood and peat for heating plants and industry. Lignin, the residual product that remains when ethanol is produced from cellulose, is an excellent fuel that can be used in briquettes. For this reason, placing the coming ethanol production plant next to the biofuel factory could be economical and resource efficient.

China committed

Decisive for the project's progress was the fact that it created contacts with Chinese energy players who see the necessity for China to move from coal energy to more environmentally friendly forms of energy. The Chinese were prepared to contribute capital and expertise in order to develop the bioenergy combine of the future, with global appeal.

Apart from the ethanol plant and briquette factory, a combined heat and power station will be included in the combine. The fuel produced by the combine generates power and heat for the plant, district heat for Sveg's inhabitants and electricity for the national grid. To make maximum use of the energy output, greenhouses will also be built to make use of every bit of waste heat – fruit, vegetables, herbs and spices or flowers will be cultivated on the 50,000 square metre area of greenhouses.



“The collaboration with ABB has been fruitful and straightforward,” says Lars Fritz, MD, NBE Sweden. “Our development work includes assessing what the 800xA control system can contribute in preparation for the construction of the full-scale ethanol plant.”

In addition, biogas will be produced from the distillery residues, which is refined to give vehicle fuel. In this way, the bioenergy combine can make use of an extremely large proportion of the raw material’s theoretical energy content, at the same time as the bioenergy solution can easily justify its place in a recycling society.

While waiting for environmental permits and other important pieces of the jigsaw to fall in place, work is underway in NBE Sweden’s pilot plant to fine tune the new technology for converting cellulose into fermentable sugar. On the Swedish side, the focus is mainly on wood as a raw material, while both of the main Chinese owners, NBE Co Ltd and Dragon Power Co Ltd, are primarily interested in straw.

The heart of the pilot plant is the hydrolysis vessel, where the cellulose is split into sugars. The parameters that affect the process are not difficult to understand; time, temperature, pressure and pH value are controlling factors. However, precision must be high in order to optimise splitting, and this is where ABB’s control system 800xA enters the picture.

“The control system is extremely important,” says Lars Fritz, MD for NBE Sweden and the architect behind the pilot plant. “One of the strengths of the 800xA system is that a lot of data can be extracted to control the process.”

“Since our technology, which is based on batch-wise treatment of the raw material, is untested at the industrial scale, we are working intensively with the Faculty of Engineering at Lund University. There is constant feedback to fine tune the recipe. We still haven’t learnt how to take full advantage of all of the control system’s possibilities, but we will.”

New control technology

ABB was involved early on with the setting up of the pilot plant.

“Even if we have sold thousands of examples of the 800xA control system, each project is unique,” says Ronny Athle,

Project Manager at ABB. In this particular case, it has been great fun to be involved and to design a technology which has thus far been untested.” Lars Fritz places great value on ABB’s commitment.

“During the project planning phase, we received a great deal of professional advice from ABB, primarily via Jörgen Karlsson who was a member of our Project Group. There is, as you know, an enormous amount of expertise in the ABB Group. Another reason for us choosing ABB was the fact that they could deliver a complete control system, including software. This removes many problems.”

“Of course I am pleased with ABB’s input. If I were to start again from the beginning, I would absolutely ring the number for ABB and Jörgen Karlsson again!”

NBE Sweden

NBE Sweden AB was founded in 2006 and is owned by the Chinese energy companies National Bio Energy Co Ltd and Dragon Power Co Ltd, together with Härjedalens Miljöbränsle AB and Härjedalen Municipality.

The next step is to build a full-scale energy combine.

ABB’s supply

- Automation system 800xA.
- Control system AC800 Controller with Profibus fieldbus.
- Instrument delivery including weighing equipment.
- Plant construction, fieldbus design and plant documentation.
- Function commitment DCS from definition to commissioning and completed plant.

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The hydrolysis tank with ABB's control system 800xA is the heart of the pilot plant.



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