

Fueling efficiency

ABB's System 800xA is helping small bioethanol production plants stay productive

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Biofuel is becoming a necessary part of life. At the end of 2010, the European Union will require a minimum of 5.75 percent of biofuels and other renewable fuels in gasoline and diesel oil used for transport. The objective, however, is to be using as much as 20 percent alternative fuels by 2020.

With this challenge in mind, St1 Biofuels Oy in Finland has begun its own ethanol production using food waste. The company is the first in Finland to produce bioethanol from such waste, which is gathered in the neighborhood of the plant. In addition to providing the drives employed in this innovative manufacturing process, ABB is contributing by monitoring the production process via its Industrial^{IT} 800xA Extended Automation System.



Photo courtesy of St1 Biofuels Oy

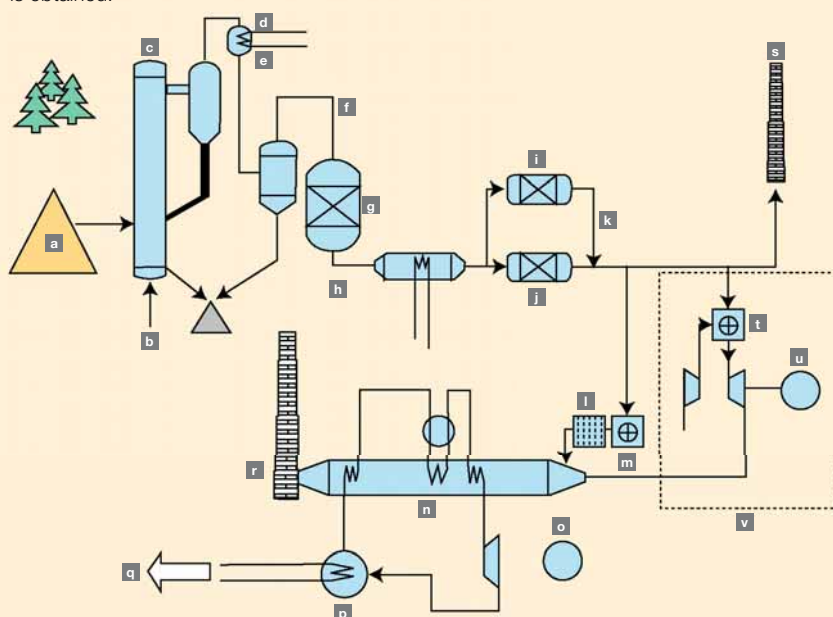
Combining two distillation stages – the fermentation of the raw material and the separation of ethanol from water – this method of bioetha-

nol production can be implemented with the simplest available equipment. The process, which won the 2008 innovation award from Finland's

Chemical Industry Foundation, makes it possible to utilize smaller plants situated close to the raw materials. As a result, the operational costs

Ethanol production principles

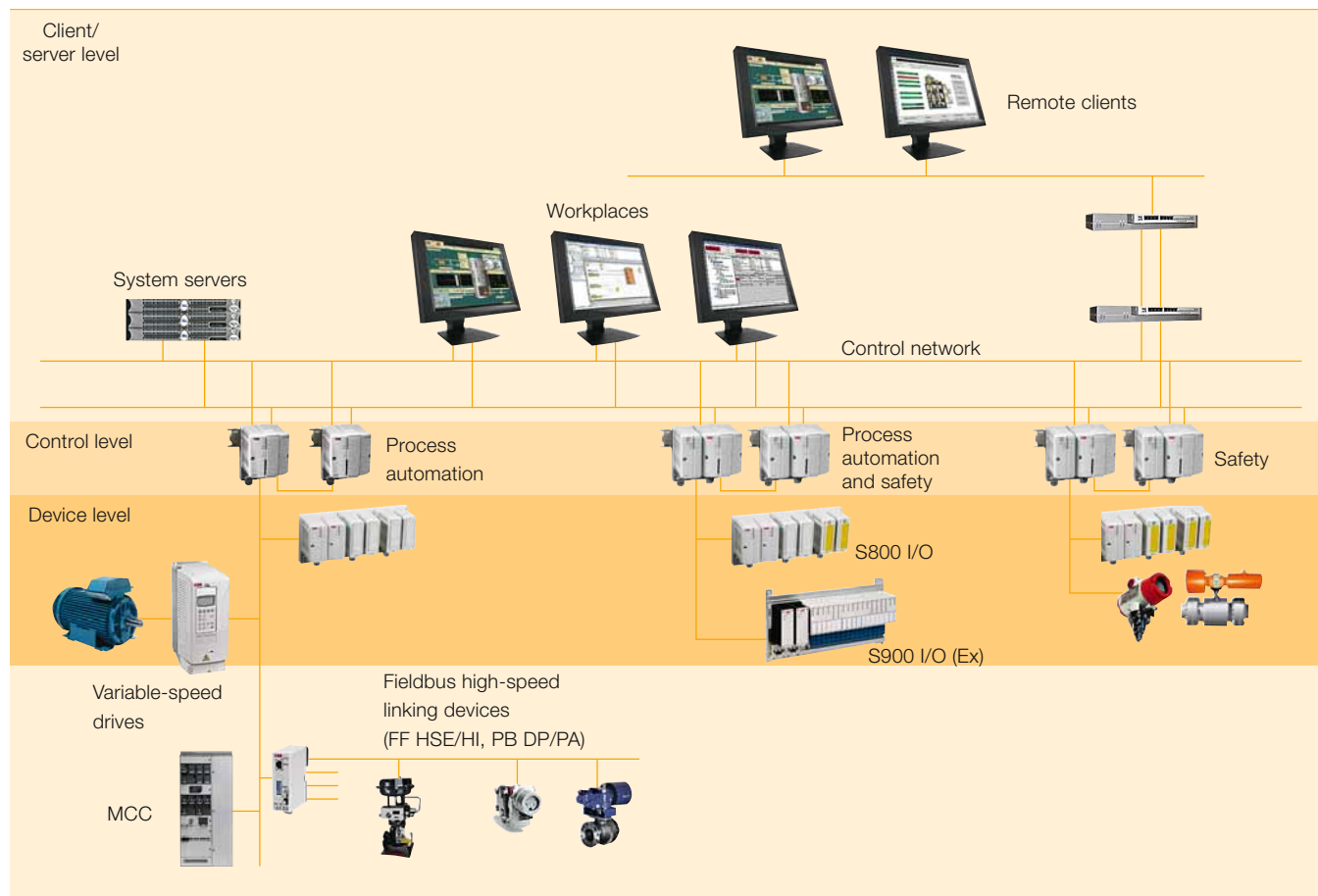
Ethanol is produced from a crop fermentation that converts starch into sugar (molasses) and again changes molasses into alcohol. Through distillation, a pure alcohol of 95 percent is obtained.



- a Biofuel
- b Steam + oxygen
- c Gasifier
- d Gas cooler
- e Hot gas filter
- f Steam + oxygen
- g Reformer
- h Gas cooler
- i Water gas shift
- j Hydrogenation
- k Synthesis gas
- l Quench duct
- m Burner
- n Heat recovery boiler
- o Steam turbine
- p Condenser
- q Cooling to air
- r Stack
- s Flare
- t Burner
- u Gas turbine
- v Bypassed processes

R & D focus

A simplified overview of a process plant built around System 800xA



are smaller than those of larger plants.

The St1 Biofuels¹⁾ plant in Lappeenranta is an unmanned building of about 500 square meters, with control of the process performed remotely, thereby eliminating the need for operators at the plant.

The company has additional plants in Närpiö and Hamina in Finland. The Lappeenranta plant produces ethanol from bakery and confectionery waste, the Närpiö plant uses potato-processing waste and the Hamina plant utilizes bakery and other food-industry waste.

Compared with the traditional distillation technologies used in big plants, smaller plants offer several advantages. Small plants require less equipment and less energy per liter of ethanol produced. The plant concept also supports the aim of reducing carbon dioxide emissions, and does not use fossil raw materials.

The easy-to-use process and the compact plant size make a strong case for the future of this method of bioethanol production, especially in densely populated industrialized countries with ample supply of food waste.

ABB's System 800xA with operator and process stations monitors the production process at the small bioethanol plant.

System 800xA at work

ABB's System 800xA with operator and process stations monitors the bioethanol production process, and ABB drives are connected by a PRO-FIBUS DP fieldbus to the system. In addition, ABB provides a variety of services such as commissioning and training. With System 800xA, it is also easy to control the ethanol process locally.

Since its introduction in 2004, System 800xA has been sold to more than 4,000 new and existing ABB customers in a diverse range of industries. Having proven itself in larger plants, the automation system is also demonstrating its strength in small plants.

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Footnote

¹⁾ St1 Biofuels Oy is the joint venture of VTT Technical Research Center of Finland and private owners.