

From the June 2008 Issue

## Wheat Dreams at Ensus

**Its feedstock is a staple, yet backers of the UK's biggest ethanol venture did their sustainability homework and claim little net impact on food.**

by Michael Kenward

Following recent media coverage, you would think that biofuels threaten doom and destruction to the planet. The United Kingdom's prime minister, Gordon Brown, even went so far as to call for biofuels to be on the agenda for the G8 economic summit in Japan in July, a meeting of the eight most powerful nations in the world.

This would not seem to be an auspicious environment in which to set up a new British business to turn wheat into biofuels. Yet the people behind Ensus Ltd. believe that the company's plan to make ethanol for transport fuels is more sustainable than alternatives.

When lining up investors, the fledgling firm went beyond writing the usual business plan. Presentations to prospective backers detailed the company's sustainability analysis and production processes. Such is the need to make the case for biofuels in the UK that Ensus even contributed peer-reviewed evidence to the Royal Society, the UK's leading science academy.

For Alwyn Hughes, the Ensus chief executive, sustainability analysis is essential when considering approaches to biofuels production. "The question is not about whether biofuels are good or bad," says Hughes. "It is about differentiating between good and bad biofuels." Hughes wants to prove that Ensus is among the good guys.

Ensus has its roots in the UK's chemicals industry. Hughes and Ensus Chairman Sir Rob Margetts first worked together at ICI, at one time among the UK's largest and most respected companies and a world player on the chemicals market. Imperial Chemical Industries Ltd. lost its way in the 1990s, selling off most of its bulk-chemicals businesses and focusing on specialty chemicals. ICI finally succumbed to a takeover by Dutch rival Akzo Nobel nv earlier this year.

By then both Margetts and Hughes had moved on from ICI. In Hughes's case, after leaving the chemicals company he ran an startup. Sir Rob held a number of senior board positions, including chairing Legal & General Group plc, one of the UK's biggest insurance companies information-technology.

### In Their Dreams

While at ICI, Hughes was responsible for a number of billion-dollar capital projects. In contrast to those massive initiatives, Hughes calls Ensus relatively modest £250 million venture (\$500 million) "a process engineer's dream."

Work on the new plant, boldly labeled Ensus One, began in May 2007. Ironically enough, it's going up in Teesside, in the UK's northeast—on land once occupied by a polymer plant that Hughes had built while at ICI. This time, though, technical demands are fewer. The facility has none of the complexity of the chemical plants Hughes and Margetts helped build for ICI. Indeed, Hughes jokes that the ethanol plant is really just a large whiskey distillery, and the technology has been around since Cleopatra.

Nevertheless, thanks to its ICI heritage, the 2,000-acre Wilton International site at Teesside is a ready-to-go industrial complex with much of the infrastructure needed to support Ensus process technology.

The context is global: Singapore-based SembCorp Utilities Pte Ltd owns the site and the Ensus One's technology is from Katzen International Inc. of Cincinnati, Ohio, in the United States.

Ensus One is scheduled to start operations in early 2009. The facility will need about 1 million metric tons (1.1 million tons or 37 million bushels) of wheat per year, but will also be able to process other grain crops, including corn and barley.

The plan is to start with an annual production capacity of 400 million liters (100 million gallons)—about a third of the UK's estimated demand for ethanol.

This demand arises from the nation's Renewable Transport Fuel Obligation, which took effect in April. The RTFO requires that 2.5 percent of all transport fuels be biofuels, rising to 5 per cent in 2010—a target that has come under much scrutiny recently.

### A Safety Net of Deals

Ensus already has long-term commitments from big partners. Oil giant Shell International bv of the Netherlands contracted to take all the ethanol that Ensus One produces. Cargill Inc., the big U.S. agricultural-products company, will provide feedstock and take the distillers grain coproduct. Atop the \$500 million that Ensus raised for the venture, a further £60 million pounds (\$120 million) comes from its strategic partners.

The arrangements were a part of an imaginative business plan that persuaded Sir Rob to become the company's chairman. More such deals further reduce the venture's risk. As well as the commitments on inputs and outputs, Ensus has arrangements with SembCorp, which will supply energy to run the plant, and Royal Vopak, a Netherlands-based bulk-logistics specialist that manufactures tanks to hold the output. Ensus has even found someone to buy the carbon dioxide from the plant.

### **Still in the Food Chain**

Energy for the facility will come from a combined heat and power plant. This, says Hughes, gives Ensus a smaller carbon footprint than some rival biofuel projects—yet another factor that may put the venture ahead of the pack in sustainability.

The company's sustainability analysis also takes into account the controversial topic of impact on food. Europe already has surplus wheat production. Ensus insists that turning wheat into alcohol doesn't remove the crop from the food chain. A byproduct of ethanol—distillers grain, with a significant protein component—goes back into the food chain as animal feed. "Fuel is about carbohydrate, food is about protein," Hughes explains. "We don't want the protein, so we hand it back anyway."

Hughes is careful not to claim that every bit of the crop's protein ends up in food. However, he insists that the plant's "sidestream" does a pretty good job of this, so much so that Hughes argues that using locally grown wheat for biofuel could make the EU more self-sufficient in both food and energy.

Biorefined wheat is richer in protein than the original cereal, removing the need for imported soy supplements in cattle feed. Wheat is also more efficient at capturing the sun's energy, making better use of agricultural land. When it comes to protein production, soybeans produce around 2.5 metric tons per hectare against 8 metric tons per hectare for wheat 1.1 U.S. tons per acre vs. 3.5 U.S. tons per acre.

According to Ensus calculations, it takes 0.24 hectares or one-tenth of an acre to produce a metric ton of animal feed using a combination of wheat and soybean meal—about one U.S. ton for every eight-hundredths of an acre. This turns out to be about the area needed to produce a ton of animal feed using protein concentrate made from wheat alone—and that wheat can produce biofuel as well as animal feed. In other words, as Ensus puts it, "biofuel produced this way therefore requires theoretically no net increase in land." Hughes has another way of putting this: "Biofuel from wheat is almost for free."

### **Starting Somewhere**

Ensus plans to become "a leading player in its target markets, with a number of world-scale biorefinery facilities across Europe," says Hughes. In its search for a site for Ensus Two, the company is talking to European development bodies including the group called Invest in Germany. Here too the quest is for locations with the same sort of process-industry infrastructure and access to transport and crops that already exist in Teesside.

On top of the usual list of criteria for a new site, Ensus insists that it will also assess the carbon footprint and sustainability of its prospective locations.

Hughes sees Ensus One as the first of a new generation of ethanol plants. "We aren't saying that we are building the perfect biofuel plant," Hughes says. "We are suggesting that you aren't going to get better unless you start." To put it another way, you can't have a second-generation plant before you have built the first generation.

*Michael Kenward is journalist who covers biofuels and other subjects from Sussex, United Kingdom.*