Maximising Agri-Energy Sector Returns

The biofuels debate has, to date, been largely a subset of energy security and climate change discussions (through its impact on the environment). But biofuels, and the new alliance of agricultural and energy markets that they create, are also having a bigger influence on commodity and energy markets more generally. **Michael Schwartz** examines the market and the technology requirements to support it.

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WHETHER DERIVED FROM prairie grasses or corn, palm oil or sugar, there is no doubt that biofuels will form a significant part of the world's energy future. In his 2007 *State of the Union* address, US President George Bush called for a 20% reduction in the country's use of gasoline in the next ten years, with three quarters of the cut to come from the use of renewable and alternative fuels.

> *"Corn is caught in a tug-of-war between ethanol plants and food, one of the first signs of a coming agricultural transformation and a global economic shift ... with the right plants, 3.5% of the earth's surface could supply all of humanity's energy needs ... One of the best candidates: perennial prairie grasses."*
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> *Business Week, February 2007*

China has also announced that it will be spending US$200 billion on renewable energy over the next 15 years, while the 27 Member States of the EU have committed to a 20%boost in renewable fuel use by 2020.

Many within the financial markets have not been slow to respond to the political and economic reality posed by alternative/clean energy. Estimates from New Energy Finance show that 'clean energy' investments reached US$71 bn in 2006, with a rise predicted to US$80 bn in 2007. Venture capital and private equity investment in clean energy companies soared by 68% to US$8.6 billion in 2006.

However, beyond clear-cut statements of intent, the precise nature of the future biofuels industry and the agricultural sector that support it is more ambiguous.

New Players & Strange Bedfellows

One of the more obvious questions to be asked about the fledgling biofuels sector is who the main players are likely to be. As expected, traditional energy companies are investing to gain a leadership role; the US's ConocoPhillips, Chinese CNOOC and Brazil's Petrobras are obvious examples here, taking advantage of the existing and potential natural, infrastructure and economic resources available to them. In Europe, BP and Royal Dutch Shell have long talked-up their investment and research into renewable alternatives. Most major energy companies are now following suit. However, it seems that the big names in our energy future will not be drawn exclusively from the oil, power and gas industries. Businesses that are more traditionally associated with the agricultural markets are seeing expansion opportunities too.

Many are already investing – and with unexpected partners. For example, Monsanto and BASF have joined forces in a genetic seeds venture in which the two companies will share funding of up to US$1.5 billion to develop genetic traits that increase yields and hardiness from corn, soybean, cotton and canola crops.

ConocoPhillips is partnering with US meat producer Tyson Foods Inc. to make biodiesel. The two companies said they will use beef, pork and poultry by-product fat to create transportation fuel. Other names entering the market include the agricultural processor Archer Daniels Midland and chemicals giant Dupont.

'Clean Energy' investments reached US$71 bn in 2006

To add further complication, a number of financial institutions with commodity desks are getting in on the game, and all this before we consider the completely new pure-play companies; the ethanol and biodiesel producing start-ups, hoping to take advantage of our growing awareness of the consequences of fossil-fuel dependence.

Winners, Losers or Equal Partners?

If the shape of the market, in terms of participants, is a complex pattern of inter-related competitive and collaborative partnerships, then the same can also be said for the actual fuel that will be produced and the raw products that will be used to supply it.

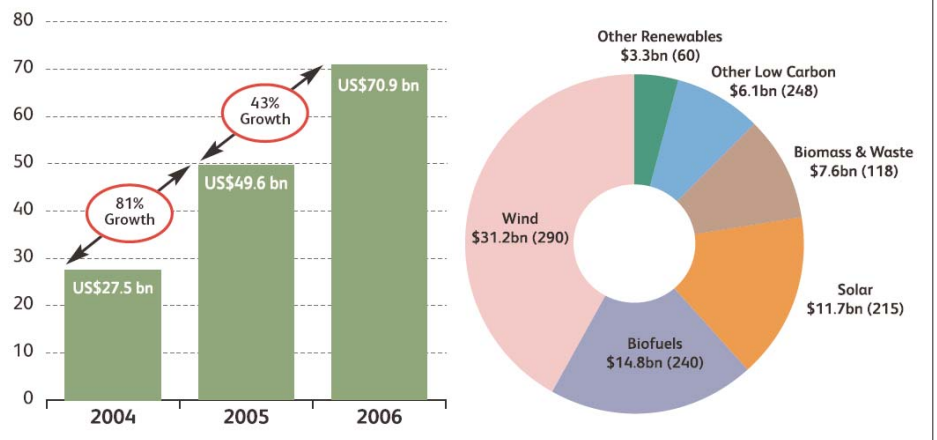
In the US, at least in the short-term, corn-derived ethanol is likely to dominate the market, not least for political reasons and the strength of the corn-growing lobby. On the other hand, Brazil uses sugar-ethanol derived from its abundant and easily grown native crop.

These two countries currently represent approximately 70% of bio-ethanol production. But other parts of the globe are looking to their

own indigenous crops for biofuels and catching up with the lead taken by the US and Brazil. For example, palm oil is being used for biodiesel in Malaysia, while Europe is looking towards its wheat crops as a fuel source, and even forestry (which through secondary processing can be converted to ethanol). There is also a growing demand for biodiesel derived from animal or vegetable oils.

The first ever diesel engine was designed to run on peanut oil, so this form of fuel does not represent a huge leap into the unknown. On the other hand, the production level of cellulosic ethanol derived from, among other crops, the prairie grasses cited by *Business Week*, currently exists only at 'pilot' and 'commercial demonstration' scale and is therefore still something of an unknown quantity.

Figure 1: Clean Energy Investment ... & Total Value & Number of Deals, 2006



Source: New Energy Finance

At the beginning of any new technology cycle we are inevitably presented with a black and white choice, analogous to the so-called Betamax wars of the 1970s and 1980s. But given the sensitivity of this market it seems unlikely that there will be one, overwhelmingly dominant fuel or fuel-source in the future. Instead, there is likely to be a diverse mix, protected by government policy where necessary, to promote a sustainable supply.

Key Trading Technology Requirements

Ethanol is already traded on the Chicago Board of Trade, and it can be said with some confidence that the number of exchanges worldwide trading biofuel derivatives is set to grow.

The price of biofuels is inevitably linked to the price of traditional fossil fuels. Should these prices fall then biofuels are far less financially viable. What's more, the price of food crops, and hence their derivatives, will be pegged to those of energy equivalents. For example, palm oil is related to biodiesel, which in turn is calibrated to crude oil and refined products. There is also a tight demand and supply situation in the energy complex, which means that market volatility – already approaching 35% for both corn and wheat – is expected to increase.

Any system therefore needs to have an advanced architecture with the capacity to accommodate changes in business strategy quickly and easily

As with any complex and volatile market, managing risk is a key element to successful operations. Obviously, the chosen solution needs to be able to aggregate risk across multiple commodities from both agriculture and energy. The system should have the functionality to provide views of both physical and financial portfolios which drill-down to the trade level in real-time. It should also give traders the ability to calculate, view and analyse option sensitivities, VaR or any other chosen risk measurement technique, as well as conducting stress testing to simulate shocks to the market.

In addition to basic risk management functionality, an enterprise system should be able to easily and accurately model new complex trade types and structured products with agricultural feedstocks and biofuel outputs. The solution needs energy yield equivalent curves that provide precise hedge quantities for spot and forward markets allowing traders to manage the relationships between agriculture, crude oil and refined products, for example. Other attributes of agriculture and energy commodity management need to be included such as complex pricing, unpricing and rollover, volume/mass conversions, qualities, crop year, tolerances, foreign exchange exposure, and repurchase contracts.

Renewable fuels also mean new supply chain complexities that include attributes from both agriculture and energy – the ability to factor in farm procurement, transportation modes including vessel, rail, truck; blending and processing at the plant; marketing and any additional logistical requirements.

As with any new market, adaptability is crucial. Any system therefore needs to have an advanced architecture with the capacity to accommodate changes in business strategy quickly and easily.

There is no doubt that the intense focus on renewable fuel sources, and the development of a new agriculture-energy complex, presents exciting opportunities for energy traders. But these new opportunities also present new risks, new inputs and outputs, and new market patterns that need to be managed.

There is a little room for patched-up standard solutions. In this environment, maximum returns require an advanced, sophisticated enterprise system •