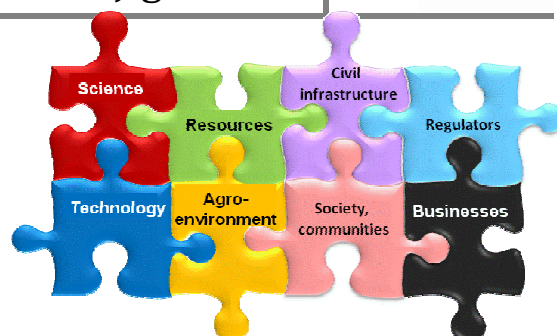


Biofuels Putting together the Green Jigsaw



Project Title:	Capacity Building in South Africa, Namibia and Ghana to Create Sustainable, Bio-oil Supply Chains
Lead	University of Greenwich
Partners	Turner & Townsend (Pty) Ltd, South Africa University of Namibia, Namibia University of Ghana, Ghana Jatropha Africa Ltd, Ghana Goldex 35 (Pty) Ltd, South Africa Consorzio di Ricerca per lo Sviluppo di Sistemi Innovativi Agroambientali (CoRISSIA), Italy Marine Biological Association, United Kingdom

Reporting Template

Case Study title Vivergo
Name of reporter Katie Thompson
Contact details k.m.thompson@durham.ac.uk
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Stakeholders interviewed- title, position in organisation Paul Lucas, Senior Bio Scientist
Any permissions / restrictions on use of information No negative reporting, check with contact prior to distribution.
<u>The Biofuel/energy supply chain</u>
Vivergo Fuels Limited was formed in 2007 as a joint venture between AB Sugar, BP and DuPont to create a biofuel business for the future, which provides sustainable energy both in terms of fuel (to deliver a significant portion of the UK's forecast biofuels demand) and animal feed. Bringing together each company's expertise the venture is split with AB Sugar and BP each owning a controlling share of 45% with DuPont controlling the remaining 10%.
AB Sugar brings substantial experience to the project with expertise from across the agricultural value chain, with links to feedstock supply as well as co-product expertise. BP is one of the world's largest energy companies and brings expertise in fuels technology and access to major fuel markets. Finally, DuPont has expertise in biotechnology and bio-manufacturing capabilities.
The plant is yet fully operational, however, from the start the project has had to address the utility of wheat as the feedstock for the production of bioethanol and animal feed. This is relevant to the food vs. fuel debate. Vivergo argue that the UK is hugely deficient in both biofuel (to meet the UK and EU's targets) as well as animal feed, but has a surplus of feed wheat. At present the UK produces approximately 14-16 million tonnes of wheat per annum, with 2.5-3 million tonnes being exported, primarily to Holland and the Iberian Peninsula.

Vivergo believes that a more sustainable solution was to utilise this surplus by sourcing their feedstock locally and preventing additional carbon usage when it travels overseas .

Vivergo also emphasise how the wheat they will utilise is not cereal grade quality and thus wouldn't enter the UK food chain, and therefore it isn't taking away from food production.

In terms of the animal feed they will be producing, their company highlight how 80% of the protein needed for EU agriculture is imported, primarily from South America. The Vivergo product will be sold back to UK farmers and this help to reduce the reliance on imported material, offering a more sustainable source.

Although exact statistics are yet available, Vivergo argue that their energy production process from field and plant to car and cow is hugely efficient, environmentally sound and economically beneficial to the UK. Furthermore, they state that their fuel will be carbon neutral and will offer Greenhouse Gas (GHG) savings in excess of 50% over standard petroleum.

Finally, Vivergo have recently gained International Sustainability and Carbon Certification (ISCC), certifying that their plant and business fully comply with the requirements of the EU Renewable Energy Directive.

The case study.

This £350million project (the capital investment for which was sanctioned by the shareholders) is situated on their 25acre plot at Saltend Chemicals Park, near Hull. The location was chosen as BP already owned the land, it is located on the 'wheat belt', next to the Humber Estuary offering existing infrastructure and utilities, such as steam generation and effluent services, as well as the existence of similar businesses already situated on the Chemicals Park made the site attractive due to existing licensing.

The availability of combined heat and power (CHP) technology, which supplies the steam and power to the plant was a huge benefit, particularly in terms of costing (potentially this could have cost £100million to build). Finally, Hull Council is very keen for renewable energy businesses to locate within the district, not only for the green credentials, but as a means for regional economic development also.

In May 2008, Vivergo received planning approval for not only the UK's largest biorefinery, but one of Europe's too. Site preparation and civil works commenced in the summer of 2008 and by November mechanical construction work had begun. By 2010 the majority of Vivergo's 80 permanent team members had been recruited and training took place. By late 2011 commissioning commenced for the biorefinery. By the Spring of 2012 construction at the Vivergo plant was nearing its final stages with commissioning continuing as the first delivery of wheat arrived at the plant. Presently the plant is undergoing some technical alterations and is due to go live imminently.

The plant uses 1.1 million tonnes of locally sourced feed-grade wheat on an annual basis, in order to produce 420million litres of bioethanol. This represents approximately 1/3 of the UK's 2012/13 requirements under the RTO. In addition to bioethanol, the plant also produces animal feed, meeting the requirement for 340,000 dairy cows each day. This represents approximately 18% of the UK's dairy herd.

The process/plant is divided up into four key stages/components – The Mill, The Brewery, The Distillery and the Feed Factory. At the mill, the wheat arrives via truck and is inspected for quality, they are then stored in one of their six silos, each of which hold 1,500 tonnes of grain. It is then processed, 'cooked', with the steam by adding water. The enzymes are added to

thin the mixture and aid the starch conversion.

Moving to 'the Brewery' the mixture is placed in one of eight fermentation tanks where yeast is added to convert to the alcohol. This results in a mixture of approximately 12% alcohol concentration. At 'the Distillery' the alcohol is separated from the fibre and protein. There the mixture is concentrated to 96% with further drying enabling a 99.7% alcohol content to be achieved, resulting in the final bioethanol product, which is then stored ready for transportation.

The proteins and fibre previously removed at distillation are taken to the 'feed factory' where they are squeezed to remove most of the water. Still being moist, it is placed in one of their three dryers. It is then stored before being delivered throughout the UK.

The plant will run for 24hours a day, 7 days a week with a two week shutdown per year for cleaning and maintenance.

Funding

According to Paul Lucas, the Senior BioScientist of British Sugar and Technical Advisor for the Vivergo plant, all the funding was internal and provided by the shareholders.

Drivers.

The three shareholders had already recognised that bioethanol would be needed in the future and individually were already researching and working with biomass prior to initiating Vivergo. However, it wasn't until the Renewables Obligation was introduced by the government did the project become realised as this ensured a guaranteed market for the product, so the economic benefit was here in addition to the environmental drivers.

Support.

According to Paul the only support integral to the project was the Renewables Obligation as it provided a "guaranteed market" [pg.4; 132].

Jobs.

According to Vivergo's website they have directly contributed approximately £60million to the local economy up to now, but they envisage that the industry overall could be worth at least £1billion per annum to the UK economy by 2020.

During the construction phases Vivergo joined up with JobCentre Plus which enabled 24 unemployed people to obtain training opportunities, 6 of whom secured permanent roles with the company in highly skilled positions. Additionally, 11 local apprentices worked on the construction site.

Overall, Vivergo will create and support over 1000 jobs. However, the business directly employs 80 people in highly skilled positions.

Business targets and wealth creation.

Obtaining information on profit expectations and wealth creation was difficult. From interviewing Paul Lucas it was obvious that the project had gone considerably over budget, but that this is not so a problem for BP or ABS (the two primary shareholders):

I: The cost of the Vivergo plant was meant to be £350million, costs went over, do you know the final costing?

P: If I did I certainly wouldn't say [laughter]

I: How was the project funded? How was the £350million sourced, did you have to obtain any external funding beyond the shareholders?

P: No. No I'm sure not, no actually am not sure, but there wouldn't have been any necessity. Both BP and ABS are both fairly cash rich. BP have had a hard time lately following their gulf of Mexico mistake, but they still have plenty of cash around, but they're like us though, they are not free and easy with their cash. In fact, the management philosophy that we adopted originally came from BP. It's a very rigorous philosophy, adopted then by British Sugar for all of their projects and I think all the cash has come internally. [pg.2; 62-72]

One of the business targets when the project was initiated was also to research biobutanol. Paul explained that this has nothing to do with ABS and is a DuPont and BP initiative only. On the Vivergo promotional literature they emphasise that they are ideally placed for future adoption of this technology, as Paul explains:

I: On the Vivergo website it frequently says that it's excited about the future and it's ideally positioned for adoption of future technology, particularly deployment of biobutanol conversion. Is that what you were discussing before?

P: Yes, yes. I mean there is also the possibility to do that.

I: Is that still something that they believe to be a future...

P: Well, as I say, BP are developing and running a pilot plant alongside the Vivergo plant.

I: and is that part of the Vivergo initiative or is that separate?

P: No it's separate. It's entirely owned by, no it's a BP/DuPont development. British Sugar have no involvement whatsoever and in fact they are very secretive about it, I've never even seen it. But I think part of the...[unclear] been operating a pilot plant at Saltend, but they are also building a demonstration plant in California I believe. [pg.4; 117-127]

Training.

As mentioned above, training was provided to eleven young adults in terms of apprentices. With regards to the training required for the skilled and unskilled roles within the company, information was lacking.

Local community stakeholder groups.

Having discussed the project with Paul Lucas, he highlighted how opposition did arise when carrying out the necessary planning meetings. This opposition was regards to the number of vehicles and increase in traffic movement the plant would generate. As an example, Paul referred to the Wissington factory, whereby at peak times they have 600 Lorries coming and going per day, 1 per minute. However, Wissington is 'in the middle of nowhere'. Whereas, Vivergo's plant is in the centre of Hull, traffic movements will all pretty much have to travel on the A63 which is already a very congested road. In order to alleviate this worry Hull Council and Vivergo are monitoring this, however, since the initial concerns were raised no further opposition has arisen (see page 3 of transcript, lines 90 onwards).

Impact on agricultural practice

This is perhaps the main concern surrounding the utility of wheat as a feedstock for the plant. On their website, Vivergo emphasise how the wheat they use is animal feed grade wheat and therefore does not take away from the food supply. This was backed up by Paul Lucas when interviewed:

"The feedstock is wheat and that was decided right from the start. At the time and I think it's probably still the case, on average there is about 3million tonnes of wheat exported from the UK at the time on to the world market...and so taking a million tonnes of wheat was not really taking anything out of the UK food chain. Although, obviously you can argue that some of that was going in to food elsewhere in the world." [pg.1; 9-13]

This is one area in which the company has had to consistently reassure both NGOs and the public as the food vs. fuel debate is a difficult issue.

Future growth plans and recommendations.

None are envisaged other than the biobutanol research as discussed previously.

1. Date of Interview:	5th March 2013
1.1 Interviewer's name:	Katie Thompson
1.2 Respondent's name:	Paul Lucas
1.3 Position within organisation	Technical Advisor (biological)
1.4 Position/role within a Biofuel Supply chain	
1.5 Name of enterprise / project	Vivergo
1.6 Location, country	Hull, England