



The Status of Biofuels in Yorkshire and Humber

Summary Spring 2008

Acknowledgments

This report has been developed by AEA Energy and Environment on behalf of the Yorkshire and Humber Assembly, Yorkshire Forward and Government Office for Yorkshire and the Humber.



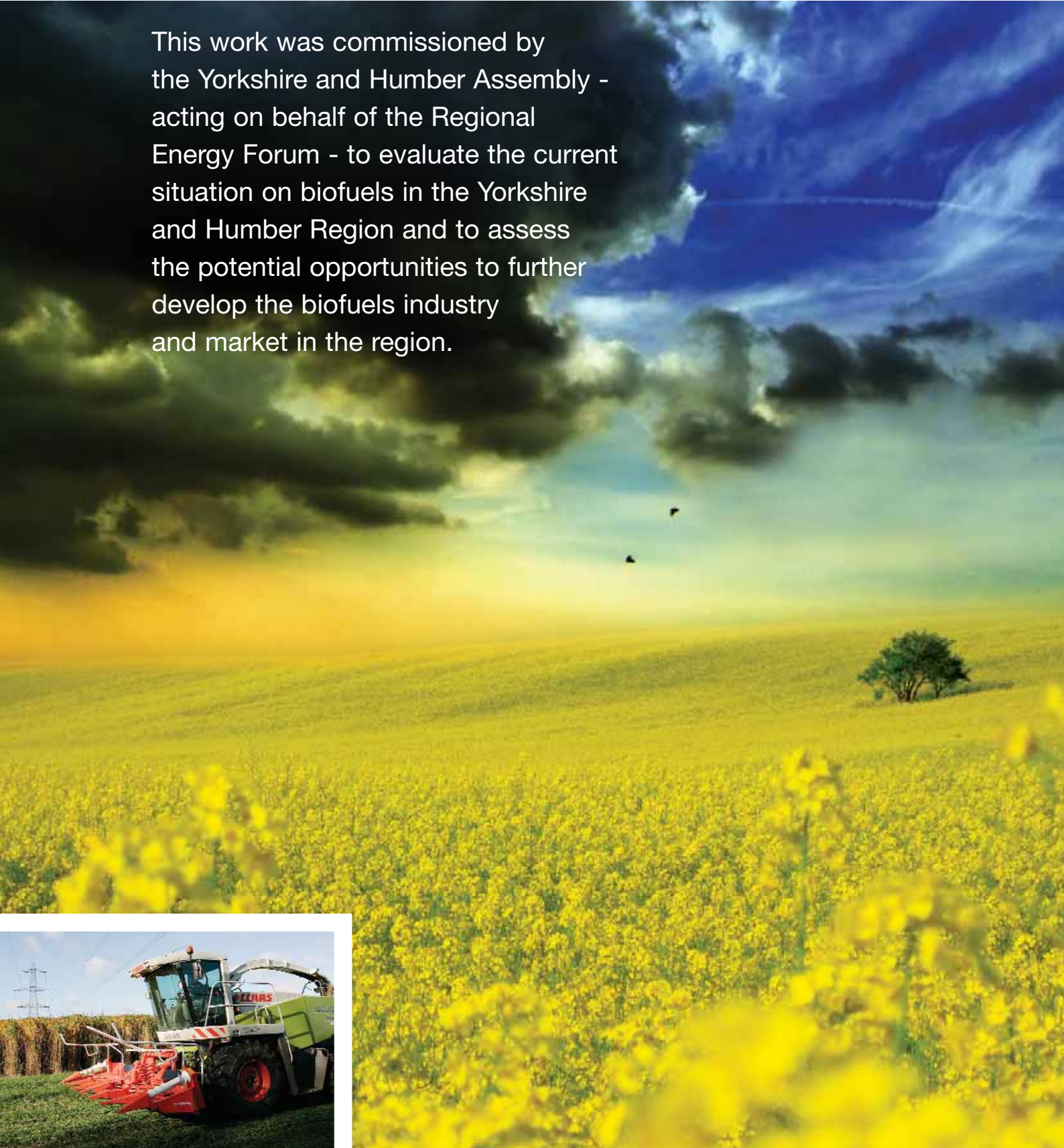
The Region's
Development Agency



GOVERNMENT OFFICE
FOR YORKSHIRE AND THE HUMBER

Executive summary

This work was commissioned by the Yorkshire and Humber Assembly - acting on behalf of the Regional Energy Forum - to evaluate the current situation on biofuels in the Yorkshire and Humber Region and to assess the potential opportunities to further develop the biofuels industry and market in the region.





The biofuels considered are liquid biofuels for transport.
This comprises bioethanol, biodiesel and second generation biofuels.

Overall Context

The EU and the UK Government wish to develop biofuels because they believe they can contribute to the following policy objectives:

- Climate change mitigation
- Diversity and security of energy supplies
- Rural development

However, biofuels are currently more expensive than petrol and diesel to produce. The EU and UK Government have therefore introduced a range of incentives to encourage the uptake of biofuels.

The EU Biofuels Directive and the UK Renewable Transport Fuels Obligation (RTFO) set minimum levels of biofuels to be placed on the market. These measures work on a volume basis, and encourage uptake of the cheapest available biofuels, currently bioethanol and biodiesel from starch/sugar and oil crops respectively.

It is recognised that these biofuels are not the most effective for Greenhouse Gas (GHG) emissions reduction, and the long term policy is to move towards second generation biofuels with higher GHG savings potential and ultimately to fuel cell vehicles. GHG savings compared with petrol or diesel are typically 40-70% for biodiesel from oil seed rape and 30-70% for bioethanol from wheat, compared with savings of 86-93% estimated for second generation biofuels.

It is also recognised that there are sustainability issues connected with production of bioethanol and biodiesel. The main issues are destruction of habitats of high biodiversity and conservation value to create plantations for energy crop production and the effect on food prices and access to use of food crops for biofuel production. In the UK the RTFO is planning to address these issues by having sustainability reporting included in the scheme. This will track the source of all feedstocks, including imported feedstocks. However, at present the RTFO does not prescribe that a feedstock should be from a sustainable source.

In future the policy instruments may change to reward higher levels of GHG savings, and require that minimum sustainability criteria are met.

Second generation biofuels are currently at the demonstration and early commercial adoption stage. The UK is behind the USA and some EU countries in the development of second generation biofuels. Until recently there was little support for development in the UK. However, second generation biofuels are now a priority area for UK Bioenergy funders and there is increased involvement with the EU biofuels programmes, for example the Department for Business, Enterprise and Regulatory Reform (DBERR) is a member of the Bioenergy ERA (European Research Area).

The concept of a biorefinery, where a variety of biomass feedstocks are converted and extracted into a spectrum of valuable bio-based products is also gaining ground in the UK, and research is underway to see how best to take this model forward.

Biofuels in Yorkshire and Humber

Yorkshire and Humber has a number of attributes that make it attractive to potential biofuels developers and for biorefineries:

- Local feedstock supplies - wheat and oil seed rape (OSR), also experience of perennial energy crops
- The Humber ports - experience of handling biomass, grain, oils - capacity to expand biofuels imports
- Land available around the ports at reasonable cost, with transport connections
- Two local oil refineries - already interested in purchasing biofuels and taking output from operating plant
- Local chemical industry interested in opportunities from biofuels
- Skilled workforce available in area

The existing infrastructure and local OSR and wheat feedstock availability make the Yorkshire and Humber Region a strong contender for further development of first generation biofuel plant.

There is already biodiesel production in the region at all scales. At the large scale the Greenergy plant at Immingham docks has a capacity of 100,000 tonnes per annum (tpa), and uses UK grown and imported vegetable oils as feedstock. At the medium scale the RIX biodiesel plant in Hull has a capacity of 50,000tpa and uses Recovered Vegetable Oil (RVO) as a feedstock. At the small scale the region has a number of schemes producing 10-1000tpa biodiesel from RVO.

Our analysis suggests that another large scale biodiesel plant and more small scale biodiesel plants would be feasible for the region utilising a substantial proportion of locally sourced feedstocks. Additional large scale plant would be possible, but would rely heavily on imported feedstocks.

There is no current bioethanol production in the region. Five large scale plants are currently proposed, all in the South Humber Bank area. All these plants intend to use locally produced wheat, but also intend to import a substantial proportion of their wheat feedstock. Our analysis suggests that the port location is the best location for these plants, and that two plants could be supported using 50% wheat feedstock readily available from the local area. If wheat were also sourced from adjacent areas, then up to 5 plants might be supported. Further plants would be possible, but would rely more heavily on imported feedstocks.

Possible constraints on additional bioenergy production might be:

- Amount of land available for crop production - in addition to ensuring that food supplies are maintained, land is also required to develop energy crops for electricity and heat production and for other novel agricultural enterprises
- The need to consider environmental issues both in feedstock production and in project development around the Humber estuary, which is an internationally important wildlife area. In particular the biodiversity issue is important if substantial areas of set aside or temporary grassland are used for energy crops, and there is a need to find a way forward that meets both environmental and economic considerations in the Humber Estuary. We recommend that a strategic way forward should be developed collaboratively between all interested parties to take account of both environmental and economic considerations. We believe this will facilitate appropriate development in the area.
- Road transport in the rural areas of the region
- Port capacity - currently there is sufficient capacity to import and store feedstocks, but this may be constrained if there is a large expansion in the area
- Regional funding available to support biofuels projects

We believe the Humber area would be a good location for development of a second generation biofuels plant in the UK. Second generation plant will require the same infrastructure and markets as first generation plant, and so will be attracted to the area. In addition second generation technology has more synergies with the chemical industry, and in particular companies developing other bio-based products. Second generation plant will also require large quantities of wood, perennial energy crops and crop residues as feedstocks. A supply chain for these is already developing in the area due to the use of biomass for co-firing, but further support to consolidate reliable large scale supplies of biomass will be required to support a second generation biofuels industry in the region.





Biofuels in Yorkshire and Humber (continued)

Threats to development of the bioenergy industry are thought to be:

- Sustainability of biofuels production - first generation biofuels may be less attractive if the sustainability issues lead to imports of palm and soya oils being constrained and/or price increases for these feedstocks
- Second generation technologies continue to be developed in USA/other EU countries and not attracted to Humber region
- Cheap imports mean local suppliers do not gain benefits
- UK competitors offer better location packages and projects are not attracted to the Humber area
- Planning approval is slow/onerous so projects are lost

We believe the prospects of developing a long term biofuels industry in the Yorkshire and Humber region are good. The existing infrastructure and feedstock supply chains for wheat and OSR make the region ideal for further development of first generation biofuels plant. The region is a strong contender for development of second generation technologies due to the infrastructure, and Research, Development and Demonstration base in the region. However, further development of the currently fragmented lignocellulosic feedstock chain is required.

Development of such an industry can help towards policy objectives of GHG emissions reduction, inward investment, skills development and rural development.

We recommend the following actions which we believe will enable the opportunities to be realised:

- Increase RVO collection and utilisation at the local level, especially around large centres of population
- Encourage the use of biofuels in local Government transport fleets
- Encourage all farmers growing crops for biofuels to enter Environmental Stewardship schemes and to follow Best Practice Guidelines for production of energy crops
- Support supply chains to supply local wheat and OSR to energy projects
- Continue to develop supply chains for perennial energy crops for supply to both power plant and second generation biofuels plant/biorefineries
- Foster a partnership approach to agree a strategic way forward to develop the South Humber Bank to take into account both environmental and economic objectives
- Establish up to 2 of each large scale bioethanol and biodiesel plant around the Humber estuary. Enhance economic viability of these plant by best use of by-products for both heat and power generation and for extraction of added value products.
- Immediate opportunities for the chemical industry to become involved in processing of by-products e.g. glycerol, into higher value products
- Take forward the biorefinery concept. Extend current biofuels interest group to include oil, chemical, power generation industry and research institutes in the area, to discuss best use and development opportunities for all possible products from bioenergy plant.
- Attract R&D activities in biofuels to the Yorkshire and Humber region. Universities and Institutes in the region are already active in the bioenergy field. Apply to DBERR, Energy Technologies Institute (ETI), Biotechnology and Biological Sciences Research Council (BBSRC) and EU for involvement and funding for second generation biofuels projects, with a view to establishing a centre of excellence in the area.
- Act to encourage siting of pilot plant for second generation biofuels in the Yorkshire and Humber region

Consultees

The consultees who assisted in the development of this Status of Biofuels in Yorkshire and Humber Summary are listed below. We would like to acknowledge their contribution and thank them for their support.

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Hilda Coulsey	Yorkshire Forward
Kate Walker	North East Lincolnshire Council
Geraint Evans	National Non-Food Crops Centre
Michael Padgett	Yorkshire and Humber Assembly

Bical has supplied images on pages 3 (inset) and 5.

The National Non-Food Crops Centre has supplied image on page 6.

A copy of the full report can be found on the Yorkshire and Humber Assembly web site: www.yhassembly.gov.uk





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