

## Biofuels briefing note - summary

### Introduction

Until 18 months ago, biofuels were widely hailed as a key weapon against climate change but more recently, they have received a bad press, with concerns about environmental sustainability and wider impacts on food insecurity becoming prominent. This has led some to call for biofuel targets to be scrapped at both the UK and EU level.

We believe there is a strong case for the UK to maintain its current targets and support the proposed EU target of 10% use of biofuels by 2020.

This note focuses on the most controversial issues. It is not a briefing on biofuels in general or on the detail of UK or European policy. We have also prepared separate notes on the impact of biofuels on food prices and on land use pressures. For more information, please call Paul Thompson on 020 7747 1830.

### Environmental and Social Sustainability of biofuels

The Renewable Transport Fuel Obligation (RTFO) came into force on 15<sup>th</sup> April 2008. The obligation falls on oil companies and fuel importers (not the biofuel producers) to replace a percentage of their annual fossil fuel sales with biofuels. The level is set at 2.5% initially, rising to 5% by 2010/11.

'Obligated suppliers' must make monthly reports on the biofuels they supply under the RTFO to include achievement against a range of environmental and social criteria. This information will be published. The criteria are:

- Preservation of carbon sinks, biodiversity, impacts on earth, air and water quality
- Land use change
- Workers' rights and land use rights

The sustainability reporting mechanism in the RTFO is truly world-leading. It puts the UK in a strong position to influence the global biofuels market by having robust data on which to base a workable certification scheme.

The government has announced its intention to move to mandatory sustainability standards by 2011, although in practice this will be overtaken by the mandatory standards to be introduced under the EU's proposed Renewable Energy Directive. The REA has already called for these standards to mirror those in the RTFO.

## Greenhouse gas (GHG) savings of biofuels

Biofuels have the potential for significant savings relative to fossil fuels, but this depends entirely on how the biofuel is produced. For example, British Sugar's plant at Wissington produces a 71% saving from locally-grown sugar beet. By contrast, savings under the US maize-ethanol programme appear to be negligible. 50% is a good average for current technologies.

If carbon sinks such as rainforests or peatland are destroyed to grow biofuels the CO<sub>2</sub> released will take decades to pay back. The RTFO reporting covers these potential adverse consequences by the criteria on preservation of carbon sinks, biodiversity and land use change. Destruction of carbon sinks and areas of high biodiversity will be outlawed under the EU's Renewable Energy Directive.

The carbon intensity of biofuels supplied under the RTFO is included in the monthly reports. Suppliers can use default values, but these are conservative – this should encourage companies to provide real data which will ensure the design of the next phase of the scheme is based on experience rather than theory.

The government has announced its intention to link financial rewards for biofuels directly to GHG savings from 2010. This is the best way to encourage new technologies and improvements in existing technologies. Given the harm caused by destruction of carbon sinks, this must be factored in to any redesign of the scheme.

## RTFO facts

- The RTFO target is 5% by volume in 2010
- The UK road transport fuel market is about 40million tonnes – 5% by volume would be 2 million tonnes of biofuel
- If the targets are met, the CO<sub>2</sub> savings will be the equivalent of taking nearly a million cars off the road.

## What would happen if we abandon biofuels targets now?

- Other major countries will press ahead, whatever the UK and EU decide<sup>1</sup>
- We will lose the chance to influence other producing and consumer countries. The UK standards are world-leading. It is unlikely any other country or region will pursue sustainability standards at the same level if the EU does not lead the way
- There would be no significant impact on rates of deforestation
- There would be no significant impact on level of food insecurity
- The achievement of the overall target in the Renewable Energy Directive (20% of EU energy to be renewable by 2020) would be in serious doubt

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<sup>1</sup> For example: India will have a mandatory blend of 10% ethanol by volume from October 2008; All gasoline sold in Brazil must contain between 20-25% bioethanol; the US Energy Independence and Security Act 2007 requires 36 billion gallons of bioethanol by 2022 – of which 21 billion must come from advanced biofuels.

## Conclusion

- We cannot generalise whether biofuels as a whole are good or bad. Everything depends on how the biofuel is made. Carbon and sustainability standards, such as those in the UK's RTFO – to which the UK biofuel industry is committed - enable us to tell the difference
- Biofuels are not responsible for recent increases in food prices
- There is enough land available to meet the demands for food, feed, energy and other uses. Globally, biofuels account for only 0.15% of suitable productive land
- Questions of sustainability apply to all uses of land – biomass for other energy uses, building materials, chemicals, textiles and food
- Biofuels are not a major driver for deforestation, which has been going on for decades. Much of the motivation is access to timber, and biofuels take up only a tiny proportion of crops that are subsequently planted. For instance, less than 1% of palm oil imported into the EU goes into biofuels. Deforestation will continue whatever we do unless we can create an economic value for not chopping down the trees. This will require international agreements, and financial support from the developed world
- Biofuels have the potential to help the rural poor in developing countries by raising their income levels– and undo some of the harm of years of developed world agricultural subsidies and under-investment
- Sustainability standards for biofuels can drive improvements in other areas, particularly food. The proposed EU targets give us influence over producer countries that will be lost if they are scaled back significantly
- For investment to happen, industry needs certainty over the level and duration of government targets. In particular, we will not have 'second generation' biofuels in the future if there is not a functioning market now
- Biofuels can only be part of the solution. We need the full range of measures: demand management, better efficiency in cars, behavioural change and greater investment in public transport. Electric and hydrogen-powered cars have potential but are not ready yet.<sup>2</sup> Biofuels are currently the only renewable fuel available on the required scale
- We cannot wait until all the facts are in and then act. Some facts will never be known until we have experience of what works in practice. The 'wait and see' approach is a recipe for inaction – and we know that inaction on climate change has a serious cost. The resource that we are most short of is time

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<sup>2</sup> The biggest question is where the renewable electricity will come from to power the cars or produce the hydrogen. Both would also require significant changes to infrastructure.

## The impact of biofuels on food prices

Prices of some commodities have increased recently<sup>1</sup> but are still low by historical standards. Wheat prices were 15% higher in real terms in 1995/96<sup>2</sup>.

If biofuels are a significant factor in recent price increases, those commodities that are most in demand for biofuels should be most affected, but this is not the case. Wheat has shown the greatest increases, but this is not currently used for biofuel on a significant scale. High rice prices have caused hardship in the developing world, but are not an important feedstock for biofuels either. By contrast, Brazilian sugarcane accounts for 36% of global bioethanol production - but prices peaked in 2003 and in early 2008 fell below production costs for all major producers (including Brazil)<sup>3</sup>

Biofuels take up only 0.15% of the world's productive land<sup>4</sup>. It is difficult to see how something so small could possibly play a major role. Changes in the price of food are caused by a range of factors, some short-term or cyclical and some structural.

### Short-term/cyclical impacts on food prices

- Poor harvests over the last year caused by bad weather have affected the USA, EU, Canada, Russia, Ukraine and Australia. The resultant combined cereal supply shortfall of North America, Europe and Australia was over 60 million tonnes. By contrast, the increase in cereal use for ethanol in those countries was only 17 million tonnes<sup>5</sup> out of total global production of 592 million tonnes<sup>6</sup>. Climate change may mean these events become both more frequent and more severe
- World stocks are also low. For example, the wheat stocks to usage ratio has fallen from 35% in 2000/01 to an expected 19% for 2007/08.<sup>7</sup> Low stocks increase the perceived risks and therefore lead to higher prices
- Many producer countries have introduced export restrictions.<sup>8</sup> This has reduced the ability of markets to absorb shortages elsewhere

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<sup>1</sup> wheat prices more than doubled (136%) in the weekend ending 17 March 2008 compared to the equivalent week in 2007. DEFRA, 'The Impact of Biofuels on Commodity Prices', April 2008

<sup>2</sup> ibid

<sup>3</sup> FO Lichts International Sugar and Sweetener Report (2008), 4<sup>th</sup> January 2008

<sup>4</sup> Presentation by Pat Howes (AEA technology) at stakeholder seminar on the Renewable Fuel Agency's report into indirect impacts of biofuels, 22<sup>nd</sup> May 2008

<sup>5</sup> OECD-FAO Agricultural Outlook 2007-17

<sup>6</sup> Figures for 06/07. The estimated production for 07/08 is 604 million tonnes. DEFRA, 'The Impact of Biofuels on Commodity Prices', April 2008

<sup>7</sup> International Grain Council

<sup>8</sup> Countries that have introduced restrictions over at least some of the last 6 months include Argentina, Ukraine, Russia, Kazakhstan and Indonesia

- Commodity speculators may play a significant role. In 1998, investments in commodity indexes totalled \$10 billion. In 2007, the total was \$142 billion.<sup>9</sup>

## Structural factors

- There is increasing demand for meat in the developing world, particularly in India and China. Impacts on land use could be very significant - it takes about 4 kg of cereals to produce 1 kg of pork, and about 2 kg of cereals to make 1 kg of poultry meat.<sup>10</sup>
- Higher oil prices increase the cost of producing food, not least because fertilisers and pesticides are generally derived from oil. <sup>11</sup>
- The US maize for bioethanol programme may have had an impact on maize prices, although the situation is not clear-cut.<sup>12</sup> The amount of US maize converted to bioethanol rose from 1.3 billion bushels in 2004/5 to 2.1 in 06/07 (33 to 53 million tonnes) but US exports of maize rose over the same period from 1.8 to 2.1 billion bushels (46 to 53 million tonnes). <sup>13</sup>

## What next?

To a certain extent, higher prices will correct themselves, as more land is brought into production and productivity improves due to greater investment.

By no means is all suitable land currently used to its full potential. For instance, The FAO estimates that 23 million hectares of arable land have been withdrawn from production in Eastern Europe and the CIS following the collapse of the soviet system.<sup>14</sup>

There is great potential for improved productivity, particularly in the developing world, where yields are less than half those of the developed world.<sup>15</sup> The cereal and oilseeds markets have had decades of oversupply and low prices – in large part due to decades of developed world agricultural subsidies. According to the World Bank says that many countries suffer from a 'serious underinvestment in R&D and in innovation systems more generally'.<sup>16</sup>

The Secretary General of the OECD, Angel Gurría, shares this analysis. In a recent interview he blamed poor harvests, export restrictions by producer countries and changing diets in the developing world for current prices.<sup>17</sup>

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<sup>9</sup> Speech by Mariann Fischer Boel, European Commissioner for Agriculture and Rural Development, 6<sup>th</sup> May 2008

<sup>10</sup> *ibid*

<sup>11</sup> A recent study by the Sustainable Development Commission estimated that an increase in the cost of oil from \$50 to \$100/barrel would increase production costs of livestock and crops by 3-5% and 13% respectively. Study quoted in DEFRA 'The Impact of Biofuels on Commodity Prices', April 2008

<sup>12</sup> Maize prices have risen recently by 30%, but this appears out of step with changes to the wheat price. US bioethanol from maize accounts for 53% of global bioethanol production and the price of maize rose 30%. Wheat is not used on a significant scale for bioethanol – but the price of wheat has more than doubled

<sup>13</sup> USDA

<sup>14</sup> AgraFacts 14/03/2008

<sup>15</sup> Speech by Mariann Fischer Boel, European Commissioner for Agriculture and Rural Development, 6<sup>th</sup> May 2008

<sup>16</sup> World Bank, World Development Report 2008 – Agriculture for development, p14

<sup>17</sup> Interview for BBC Radio 4's 'pm' programme, 29th May 2008

## Food facts

- There is enough food in the world at the moment. Much of the world is starving while the developed world has an obesity crisis - 40% of Britons are predicted to be obese by 2025<sup>18</sup> and a 2002 estimate put the cost in England of being overweight at £7billion pounds.<sup>19</sup>
- Inequities in distribution are the root cause, not the amount of food itself. In the UK, we throw away an estimated 20 million tonnes of food every year.<sup>20</sup>
- There is not a direct link between the cost of raw materials and finished products for European consumers. Consumer prices for bread increased by 2% between 2006 and 2007, while producer prices rose 45% over the same period. This is hardly surprising, given that the share of cereals in bread production is only around 5% of the cost.<sup>21</sup>
- The average family in the UK now spends only 15% of its income on food, compared with 33% 50 years ago.<sup>22</sup>

## What will be the effect of biofuels on developing countries?

Increased demand for agriculture should help the 75% of poor people in developing countries who live in rural areas.<sup>23</sup> International development NGOs tend to agree.

For example, a recent Oxfam report said that:

'Under the right conditions, biofuels offer important opportunities for poverty reduction by stimulating stagnant agricultural sectors, thus creating jobs for agricultural workers and markets for small farmers.'<sup>24</sup>

The impacts will depend on individual countries. Although precise outcomes are hard to predict, any negative impacts will be relatively small and on a scale that could reasonably be addressed by government policies.<sup>25</sup>

Dumping by developed nations of their agricultural surpluses on world markets have depressed prices, undermining production in developing countries. A gradual, sustained increase in food prices should help those countries as they have a competitive advantage.

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<sup>18</sup> DoH (2007) Foresight, 'Tackling Obesities: Future Choice' – project report

<sup>19</sup> House of Commons Health Select Committee (2002). The estimate includes direct treatment costs, state benefits, loss of earnings and productivity (including 45000 lost working years)

<sup>20</sup> Source: WRAP

<sup>21</sup> DEFRA: 'The Impact of Biofuels on Commodity Prices', April 2008

<sup>22</sup> ONS family expenditure survey, 2007 – comparing costs in 2007 and 1957

<sup>23</sup> World Bank (2008), 'Agriculture for Development – World Development Report 2008'

<sup>24</sup> Oxfam: 'Biofuelling Poverty', November 2007, p2

<sup>25</sup> Presentation by Steve Wiggins (ODI) at stakeholder seminar on the Renewable Fuel Agency's report into indirect impacts of biofuels, 22<sup>nd</sup> May 2008

## The impact of biofuels on land use

### Is there enough land?

Around 5 billion hectares are in use globally for agriculture and forestry (out of a total land mass of around 13 billion hectares). Biofuels currently take only 13.8 million hectares – about 0.15% of the total land use. The available evidence suggests there is enough land to meet future demands for all uses.<sup>1</sup>

Additional land needed for biofuels could be 75-220 million hectares<sup>2</sup>. The FAO's senior economist, Dr Josef Schmidhuber estimates that biofuels will account for 2% of productive land by 2030.<sup>3</sup>

The land requirements for biofuels look very different if the role of co-products is taken into account. Residues from biofuel production (both bioethanol and biodiesel) can be used as animal feed. This removes the need for feed that would otherwise have to be grown elsewhere.

This could mean that the land use impact of EU policies could be negative – in other words, significant EU production of biofuels would mean that less land in the rest of the world would need to be used to grow crops for animal feed.<sup>4</sup>

'Second generation' biofuels could also reduce the land needed by over 40%.<sup>5</sup>

### Deforestation

Deforestation has been going on for many years, independently of recent expansions in biofuels. Access to timber is often the main consideration. For instance, a recent Friends of the Earth report into the Indonesian palm oil industry noted that,

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<sup>1</sup> Presentation by Pat Howe (AEA technology) at stakeholder seminar on the Renewable Fuel Agency's report into indirect impacts of biofuels, 22<sup>nd</sup> May 2008

<sup>2</sup> *ibid*

<sup>3</sup> Quoted in *New Energy* magazine, April 2007

<sup>4</sup> *ibid*. The scenario considered is the Renewable Fuel Agency study's 'medium' case – global use of biofuels at 10% by volume.

<sup>5</sup> Presentation by Ausilio Bauen (E4tech) at stakeholder seminar on the Renewable Fuel Agency's report into indirect impacts of biofuels, 22<sup>nd</sup> May 2008. For the study's 'medium' case the estimated land requirement for biofuels is 130 million hectares without 'second generation' biofuels and 75 million hectares with 'second generation' (assuming they make up 30% of the total)

'18 million hectares of land have been cleared for oil palm, but not subsequently planted. The prime motivation for this additional land clearance is reportedly access to timber rather than plantation development.'<sup>6</sup>

Even when forest is cleared and oil palms are planted, only a tiny amount of global palm oil production goes into biofuels. Less than 1% of palm oil that is imported into the EU is used for biofuels.<sup>7</sup> As the Environmental Audit Committee noted:

'Currently only a small percentage of palm oil is used for biofuels, with most being used in food and cosmetics. The market for palm oil in these sectors is enormous – one in ten supermarket products contain it.'<sup>8</sup>

## The way ahead

Although a small part of overall demand, sustainability standards for biofuels can be used to raise standards in other regions and sectors. The long-term answer must be standards applying equally to all uses of land.

This process has already started in that the pressure to demonstrate biofuels sustainability has driven certification schemes such as the Roundtable on Sustainable Palm Oil and similar initiatives for soy and sugar cane.

Ultimately, the only way to halt deforestation will be to put a financial value on virgin forests. This will require strong, effective global agreements – and we in the developed world must be prepared to back up our concern with financial contributions.

The Renewable Fuels Agency is conducting a review into the indirect impacts of biofuels (the Gallagher Review). This will be published on 26 June 2008. Although this is unlikely to give decisive answers, it should clarify current evidence and indicate areas where more research is needed.

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<sup>6</sup> Friends of the Earth: 'Losing Ground' (February 2008) p19

<sup>7</sup> Dr Jeremy Woods, Imperial College London

<sup>8</sup> Environmental Audit Committee: 'Are biofuels sustainable?' (21st January 2008) p16