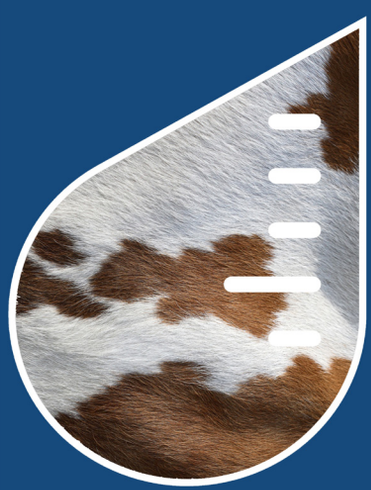
Renewable Fuels Agency

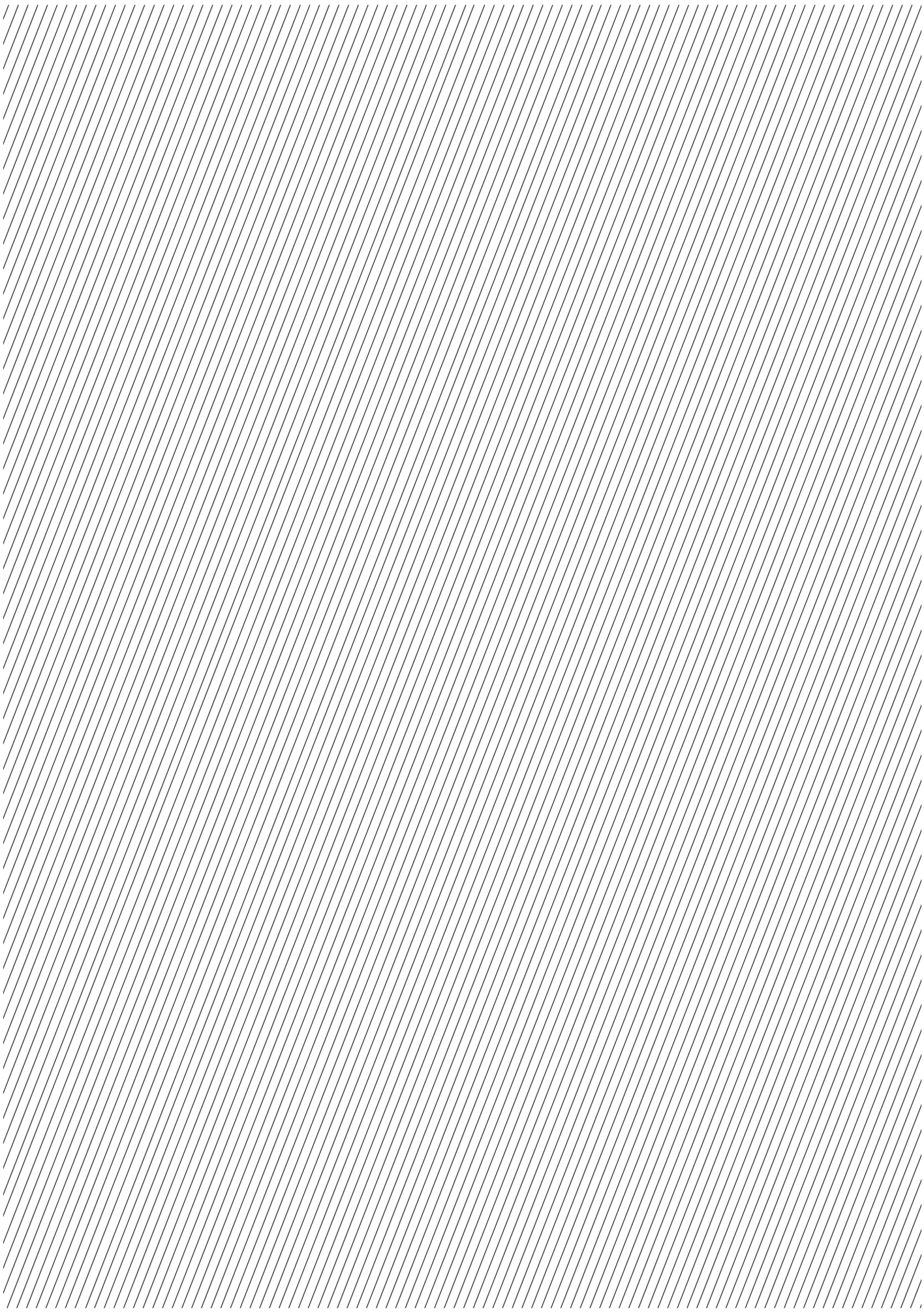
Year Two of the RTFO

Renewable Fuels Agency report on the Renewable Transport Fuel Obligation

2009/10



Renewable Fuels Agency 2009/10 Annual Report to Parliament on the Renewable Transport Fuel Obligation

Presented to Parliament pursuant to The Renewable Transport Fuel Obligations Order 2007 (SI 2007 no 3072).

January 2011 London: The Stationery Office £19.75

Any enquiries regarding this publication should be sent to us at:
contact@rfa.gsi.gov.uk

This publication is also available on http://www.official-documents.gov.uk/ and http://www.renewablefuelsagency.gov.uk/

ISBN: 9780108509681

Printed in the UK for The Stationery Office Limited
on behalf of the Controller of Her Majesty's Stationery Office

ID 2410062 01/11

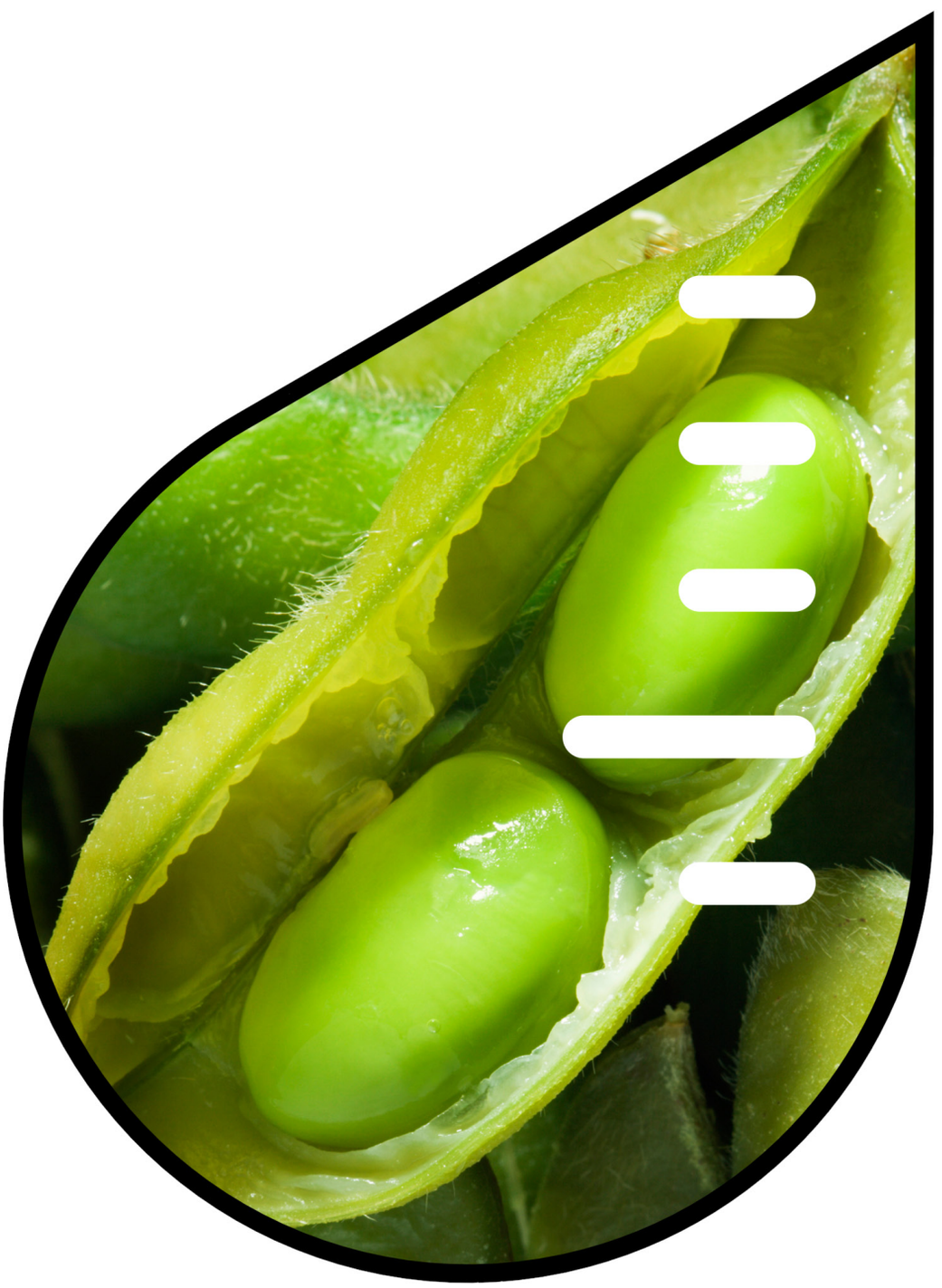
Printed on paper containing 75% recycled fibre content minimum.

Contents

The oildrop images on the section divider pages represent the five main biofuel feedstocks supplied to the UK during the first year of the RTFO, ordered by volumes in litres: soy - 480m, sugar cane - 308m, oilseed rape - 250m, tallow - 182m, palm - 99m.

Section 1

Introduction



Foreword

This annual report from the Renewable Fuels Agency marks the end of the second full reporting cycle of the Renewable Transport Fuel Obligation, under which obligated companies are required to report on both the quantity of biofuels they have supplied and their performance against carbon reduction and other sustainability targets set by the UK Government.

I am pleased to say that, during the period covered by the report, from April 2009 to April 2010, we have continued to provide accurate and timely data, confirming our position as the first regulator in the world to monitor and report independently verified information on the carbon and sustainability performance of biofuels.

Almost 1.6 billion litres of biofuels has been reported, accounting for 3.3% of the UK transport fuels and exceeding the UK Government target of 3.25%. This has resulted in significant carbon savings of 51% compared to petrol and diesel fuels, making an important contribution to reducing climate change inducing emissions in the transport sector. These savings must, of course, be weighed against the possible increase in emissions associated with indirect land-use change.

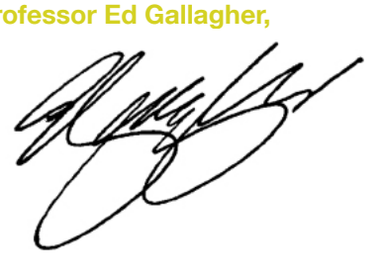
Against this success story we are disappointed that some large oil companies have failed to take significant steps towards reporting and sourcing biofuels sustainably. Mandatory carbon and sustainability requirements will be introduced in the near future through implementation of the EU Renewable Energy Directive. Those fuels that are not sourced sustainably in accordance with the Directive's requirements will quite simply not count towards targets.

These reporting and sourcing requirements may be further strengthened by the subsequent introduction of the Fuel Quality Directive. Nearly all companies, and particularly those who are currently under performing, will need to raise their performance to meet these new requirements.

Biofuels remain a controversial subject. The Agency is committed to providing accurate and independent data, technical information and advice on both the current and any proposed aspects of biofuel monitoring. We will do this openly and transparently with full consultation to enable the Government to formulate biofuels policy, and the consumer to make purchasing decisions, based on the best possible evidence.

In undertaking these tasks, I would like to acknowledge the support over the past year from our stakeholders and our colleagues in the Department for Transport, and on behalf of the Board to thank our staff for their productive work and for the positive way they are facing the challenges ahead.

Professor Ed Gallagher,



Chair

7 January 2011

Executive summary

Supply of biofuel

In 2009/10, the second year of operation, the Renewable Transport Fuel Obligation (RTFO) helped drive the market for sustainable biofuels in the UK. Of the UK's total road transport fuel supply, 3.33% was biofuel, which was slightly over the target of 3.25% required by the RTFO Order and a significant increase on the 2.7% supplied in 2008/09. Biofuel was supplied from at least 31 countries, and at least 17 different feedstocks.

Table 1.1: Targets vs. performance

	Target for 2009/10	Performance 2009/10
Percentage of feedstock meeting a Qualifying Environmental Standard	50%	31%
Annual GHG saving of fuel supplied	45%	51%
Data reporting of renewable fuel characteristics	70%	72%

With one exception, the suppliers obligated under the RTFO met their obligations in full. Most did this by redeeming Renewable Transport Fuel Certificates whilst one chose to buy out of its obligation. The RFA has pursued Yorkshire Petroleum Company Ltd (Yopec), which failed to meet its obligation in full, and has recovered a partial buy-out payment at the time of writing. The proceeds of the buy-out will be redistributed to suppliers in line with the requirements of the Order.

Of the carbon and sustainability data reported to the RFA, 98.7% was verified, 0.2% came from small suppliers and was not subject to verification, and the remaining 1.1% did not receive the limited assurance required. This is a significant improvement on last year, when 5.4% of the data remained unverified.

Supplier environmental performance

When the RTFO was established the Government set targets requiring obligated suppliers to report on how much of their feedstock met a Qualifying Environmental Standard; the average greenhouse gas (GHG) savings of their biofuels; and how much data on the source of biofuels had been reliably captured. While the targets are voluntary, reporting against them is not – though suppliers can opt to report 'unknown' in which case carbon emissions default to the biofuel source with the worst GHG emissions.

Table 1.2: Number of targets met by obligated companies

Number of targets met		Obligated company
3		Greenergy
		Lissan
		Mabanaft
		Topaz[a]
2		Esso
		Harvest
		Petroplus
		Shell
1		ConocoPhillips
0		BP
		Chevron
		INEOS
		Morgan Stanley
		Murco
		Total
Unverified	0	Prax

a Topaz, as a low volume supplier of biofuels, was not required to verify its data.

As might be expected from a system based on voluntary targets, some suppliers have embraced the targets while others have chosen simply to comply with their minimum legal obligations. At the top of the scale, Greenergy, Lissan, Mabanaft and Topaz met all three targets. At the other end are those that performed poorly against the targets, meeting just one or even none at all. These were ConocoPhillips (one target) and BP, Chevron, INEOS, Morgan Stanley, Murco and Total (no targets met) and Prax, which failed to submit a verified sustainability report meaning provisional claims were not backed by adequate assurance.

This was the second year that Prax failed to submit a verified report. As the data was not verified, the RFA changed all of Prax's biofuel sustainability claims to 'unknown' – a default that assumes poor sustainability performance and high carbon intensity. Significant improvement will be required by many suppliers. As well as sourcing sustainably, suppliers will need to ensure that information from supply chains is collected and can be verified in order to meet the challenges

3.33%

of the UK's total road transport fuel supply was biofuel

of mandatory sustainability requirements under the EU's forthcoming Renewable Energy Directive (RED).

Carbon emissions

Lifecycle savings, direct effects

Based on the RFA's lifecycle analysis methodology, the fuels supplied under the RTFO in 2009/10 delivered a 51% carbon saving compared to the equivalent fossil fuels, a reduction in carbon emissions of two million tonnes of carbon dioxide equivalent (CO_2e). This is in excess of the Government's target of 50% savings and consistent with the original Regulatory Impact Assessment (2007) for the RTFO legislation. The RED requires the use of a different lifecycle methodology. An analysis using the default emissions factors contained in the RED suggests that we would have reported a similar overall carbon saving.

In 2009/10, 29% of previous land-use was reported as 'unknown' due to a lack of verifiable evidence gathered from supply chains. This was a considerable improvement on the previous year, where suppliers were unable to verify the land use for 42% of their biofuel feedstock. The RTFO carbon lifecycle methodology assumes that feedstock from an unknown land-use actually came from land that was cropland in 2005. It is therefore possible that some fraction of the unknown land-use was recently converted to agriculture, in which case there would have been a potentially significant release of stored carbon. Under the RED, suppliers will have to demonstrate that their feedstocks were not sourced from carbon rich land or land with high biodiversity value.

There are examples of good practice where tracking actual carbon emissions data has allowed companies to report substantially better than default emissions savings, for example for UK sugar beet. More generally, in the long term, substantial reductions in emissions from biofuels should be achievable. For instance, it should be possible to reduce soil emissions of nitrous oxide with improved understanding of optimum fertiliser application rates. Specific activities such as methane capture for palm oil mill effluent also offer large potential savings.

Indirect effects

The indirect effects of biofuel production are not accounted for under the RTFO. These are currently difficult to assess with any degree of accuracy. While it may be relatively easy to see the direct land-use changes associated with growing feedstock for biofuel, it is considerably less straightforward to accurately assess the net carbon effect on global land use of meeting growing demand for biofuel. The RFA's Gallagher Review and subsequent work has found that greenhouse gas emissions from indirect land-use change (iLUC) driven by the use of biofuels could be significant, but iLUC remains a highly controversial issue. The European Commission is considering how to address this issue in the Renewable Energy Directive.

The RFA has been at the forefront of those working towards practical solutions to the iLUC issue. Following the Gallagher recommendations, the RFA sponsored the development of a practical methodology to demonstrably avoid iLUC, focusing on the use of new low carbon stock areas for production and the integration of livestock and crop production systems. This provides one route – there are undoubtedly others – to the promise of fully sustainable biofuels from crops.

Agriculture

The majority of cultivated feedstocks used for biofuel are not grown primarily as energy crops, but rather for the food and drinks sector or as fodder for livestock.

While some voluntary sustainability schemes were initially developed for food production, the sustainability reporting required under the RTFO and forthcoming RED requirements have considerably raised the profile of these issues in agriculture.

As part of its research programme this year, the RFA looked at agricultural production models and methods for the biofuel used in the UK, including the kind of practices promoted by voluntary schemes. The study considered nine crop/country combinations with a focus on the largest feedstock streams. A summary of the study and its findings can be found on page 57 of this report.

A study commissioned by the RFA investigating stakeholder perceptions and levels of knowledge suggested that there is still a limited awareness of biofuels and associated regulation among UK farmers. Most understanding of the RTFO and potential commercial advantages from certificate trading comes further up the supply chain. Some of the results from this study can be found on page 44.

Other economic activities

The RTFO affects businesses at all stages in the biofuels supply chain, with economic costs and benefits varying significantly by company type.

Analysis of the price differentials between biodiesel and fossil diesel and bioethanol and petrol, combined with the biofuel volumes and fuel duty relief, reveals that the total revenue available from blending biofuels was £130 million in 2009/10

The market for certificate trading has begun to mature, with the market now working as intended. Renewable Transport Fuel Certificates (RTFCs) traded in much greater volumes than last year and added real value to the sector. Certificates traded at between six and 12 pence during the period.

Currently, there is no price premium for feedstocks with assured Carbon and Sustainability provenance. While most stakeholders appear to agree that improved sustainability performance should bring added commercial value, there is currently no consensus on how this could be effectively introduced. Feedstocks meeting the mandatory RED criteria may result in premiums.

As things stand under a largely voluntary system, obligated suppliers are able to buy un-certified biofuels on the spot market, avoiding the need to establish supply contracts that are longer term. This can make securing inward investment difficult for producers seeking to supply a more sustainable product, as demonstrating the degree of certainty required by most investors can be difficult when they are relying on spot market sales.

The domestic biofuels producers expressed concern that it faced a more challenging market environment than other domestic markets in the EU and beyond. For example, respondents to the review of impacts of the RTFO on UK business noted that the UK applies a lower tariff on ethanol imported from outside the EU than other EU countries, making it harder for the UK industry to compete with imports than it is for the European neighbours. It should be noted that UK consumers benefit from this approach however, in that the UK has access to cheaper biofuels produced outside the EU.

Sustainable development

Much of the feedstock for biofuels currently supplied into the UK market comes from developing economies. By setting sustainability targets, the RTFO encourages these crops to be produced to higher social and environmental standards than might otherwise be the case. This in-turn facilitates sustainable development.

In the UK, just 1.2% of our gross domestic product (GDP) comes from farming, compared to 1.9% for the EU. By contrast, this figure is much higher in Brazil (six percent) where the majority of bioethanol supply into the UK was sourced in Year Two, and Argentina (six percent), which supplied the majority of biodiesel from soy, the single largest feedstock for the UK by volume.

In the countries that are the major suppliers of one of the more environmentally controversial feedstocks – palm oil – the gap is even greater, with agriculture accounting for 9% of GDP in Malaysia and 15% in Indonesia.

Through increasing the demand for crops to be produced in accordance with recognised social and environmental standards, the RTFO acts as a driver for change. While its influence here may be small, it is not insignificant – the potential annual revenue from meeting the UK's demand for biofuels is worth over £130 million.

Finally, it should be recognised that sustainable development is not something that only happens in other parts of the world.

Here in the UK the vast majority (93%) of domestic feedstock met a qualifying sustainability standard. The growing market for biofuel feedstock offers British farmers new market opportunities as well as. helping the wider transition towards more renewable energy in the UK's overall energy mix.

At least 11% of the feedstock entering the domestic market during this reporting period came from the UK. This included both agricultural crops and 'by-products', some of which have the potential to help divert waste from landfill (or even to capture landfill gas and turn it into fuel).

The environment generally

The principal drive behind increasing volumes of biofuels used in the UK has been environmental or, more specifically, to deliver carbon savings. It is clearly important, therefore, that environmental benefits can be demonstrated.

Although biofuels account for a small fraction of the global total of agricultural land, if biofuel production leads to an increase in land used it may threaten biodiversity and produce carbon emissions.

As the world's first attempt to regulate the sustainability of biofuels, the RTFO has made inroads into tackling this difficult issue. The reporting requirements of the RTFO, based on the Meta-Standard, have acted to encourage sustainable sourcing, and significantly enhanced market transparency in this area. Furthermore, the RTFO reporting system has been emulated in other countries, and cited as an example of an effective approach to assessing and regulating the environmental impact of a given sector's activities.

The EU's Renewable Energy Directive (RED) has also incorporated some of the elements of the RTFO. When implemented, the mandatory criteria in the RED should provide protection against the direct conversion of carbon rich or highly biodiverse land to grow biofuels. However, the RED requirements are primarily focussed on avoiding worst the practices rather than promoting the best. It remains to be seen how voluntary standards such as the RTFO Meta-Standard that go beyond the minimum will fare in the future when the new regulatory landscape takes shape.

The effectiveness of the Administrator

The majority of feedback received suggests the RFA's stakeholders are broadly happy with its performance. Highlights from the annual stakeholder survey conducted in November 2010 included the following feedback from respondents:

- 89% thought the Agency was either very effective or quite effective in its administration of the RTFO
- 84% were satisfied with the quality of the RFA's reporting
- 82% were satisfied with the quality of advice they had received
- 94% would be likely to recommend the RFA website to others

During the cycle covered by this report, we delivered all the functions required of us by the RTFO Order in an efficient and cost effective way. As can be seen from our accounts, in a period of budgetary constraints, we continued to deliver a high level of service while making real term savings of 8.7%.

The RFA has continued to report on the volumes, carbon intensity and sustainability of biofuel used in the UK. Our reporting remains world leading, not only by being the first data of this kind to be released, but in continuing to provide the public with environmental data as promptly as possible in the most useful format. We expect this reporting to be a benchmark for biofuel sustainability reporting internationally in the years to come.

Conclusion

This report outlines the progress that is being made in encouraging the use of sustainable biofuels in the UK.

It provides clear statistical evidence on an evolving market and highlights good practice as well as those areas where more work is needed.

It also demonstrates that the RFA has been an effective administrator and is widely viewed as such by its stakeholders.

The research and case studies presented in this report show that perceptions of biofuels are still in a state of flux and continue to develop. The report also provides evidence on how industry is adapting to legislative drivers both in the UK and beyond. Suppliers continue to implement often radically different procurement policies with a wide variance of outcomes for sustainability and carbon emissions.

There is the potential for biofuels to play a useful role in reducing greenhouse gas emissions without causing substantial environmental damage. However, it remains clear that this is unlikely to be achieved without careful planning and regulation.

Introduction

This is the Renewable Fuels Agency's second Annual Report to Parliament on the Renewable Transport Fuel Obligation, covering the period 15 April 2009 to 14 April 2010, as required under the Renewable Transport Fuel Obligations Order (as amended).

The aim of this report is to provide a review of the second year of the RTFO, including consideration of the national and global impacts of the supply of biofuel in the UK.

Background

Biofuels

Every year nearly 50 billion litres of road fuel are consumed in the UK. The resulting carbon emissions account for around one fifth of the UK's total annual emissions.

Biofuels are fossil fuel substitutes. They can be made from a range of agricultural crops – oily crops for biodiesel, and sugary or starchy crops for bioethanol - or from by-products and wastes like used cooking oil, tallow and municipal solid waste. Currently, the two most widely used biofuels in the UK are bioethanol and biodiesel, although there is also a small market in the supply of pure plant oil (PPO) and biogas, typically sold for fleet use. Other fuels such as hydrogenated vegetable oil (HVO) as a diesel substitute, and biobutanol as a petrol substitute, are expected to be more widely used in the future, as more advanced biofuel technologies become commercially mature.

Blended in small quantities into fossil fuels, ethanol and biodiesel can be safely used in today's road vehicles. Currently blends of up to seven percent biodiesel and five percent bioethanol can be sold without additional labelling. It is also possible to use higher blends of biofuel such as B100 which is 100% biodiesel, and E85 which is 85% ethanol, but this may require modifications to engines.

The Renewable Transport Fuel Obligation

In response to the significant threat posed by climate change, the UK has national and international commitments to substantially reduce its carbon emissions and to increase the use of renewable energy, including in transport.

The Renewable Transport Fuel Obligation (RTFO) sets targets for increasing the use of renewable fuels in UK road transport with the aim of reducing carbon emissions. Implementation of the transport element of the EU's RED is expected to be carried out by modifying the existing RTFO legislation. RED sets long term targets for the use of renewable fuels in transport to 2020.

The RTFO puts an obligation on refiners and importers of fossil fuels supplying at least 450,000 litres a year. In 2009/10, the Obligation was to ensure that 3.25% by volume of the road fuel they supply in the UK is made up of renewable fuels.

These obligated suppliers must demonstrate that they have met their Obligation by redeeming Renewable Transport Fuel Certificates (RTFCs) to the RFA at the end of the year. One RTFC is awarded for every litre (or kilogram in the case of biogas) of biofuel reported to the RFA, and an obligated supplier can obtain them either by supplying biofuel itself, or by buying them from biofuel suppliers.

There is also an option to 'buy-out' of the obligation for 15p per litre instead of redeeming certificates. This acts as a 'safety valve' which limits any effect of the obligation on fuel suppliers and consumers if there are constraints on the supply of biofuel.

Non-obligated biofuel suppliers registered under the RTFO also report to the RFA, receive RTFCs and can sell their certificates. Trading certificates provides potential financial support for the production of biofuels. The value of certificates, as tradable commodities, is determined by the market.

During Year Two, the duty payable on biofuels was 20p per litre lower than that for fossil fuels. In April 2010 the duty incentive was removed for all fuel types except used cooking oil, which will receive it for a further two years.

The Renewable Fuels Agency

The RFA is the UK's independent sustainable fuels regulator, responsible for the administration of the RTFO. We award RTFCs to suppliers of biofuels in the UK, ensure that obligated companies meet their annual obligation and run a world-leading carbon and sustainability reporting system. The RFA encourages UK suppliers to source the most

'The RFA's reporting and research helps to move forward the biofuel sustainability agenda'

sustainable biofuels, and our reporting and research helps to move forward the biofuel sustainability agenda.

Suppliers of biofuels claiming RTFCs must report the volume and carbon and sustainability characteristics of their fuel through our online reporting system. The RFA reports on the biofuels supplied in the UK, and on the performance of individual suppliers throughout the year. We publish an annual report on the wider impacts of the RTFO.

Driven by a proactive and open approach to stakeholder dialogue, the RFA engages stakeholders in the UK and beyond through regularly hosting workshops, attending meetings and conferences and with a range of external publications. The Agency is a small organisation with 14 staff, led by an independent Board. It was legally created in October 2007 as a Non-Departmental Public Body sponsored by the Department for Transport. In October 2010 the Government announced its intention to abolish the RFA as part of a wider review of public spending. The functions of the Agency are to be transferred to the Secretary of State for Transport when the abolition takes place.

The carbon and sustainability reporting system is central to the RTFO, enabling monitoring of the carbon emissions and sustainability of biofuel supplied in the UK. This reporting system is intended to be a driver of sustainability, and a stepping stone to mandatory sustainability criteria. As other nations in the EU and elsewhere introduce their own biofuel incentives and mandates, many of them have looked to the RTFO system as a useful reference model and to the RFA as a source of expert advice.

Carbon, sustainability and the RTFO Meta-Standard

Carbon reporting under the RTFO is based on lifecycle analysis of emissions from direct land use change, cultivation, processing and transport of biofuels. Companies can report using our default values for fuel type, feedstock and country of origin, or calculate emissions using actual data.

Sustainability reporting under the RTFO is based on a meta-standard approach. Existing sustainability standards are compared to the RTFO Meta-Standard, a set of sustainability criteria for the cultivation of biofuels. The environmental principles are that biofuel cultivation should not cause loss of carbon stocks or biodiversity; or damage air, soil or water quality. The social sustainability principles are that cultivation should respect land rights and workers rights. Existing schemes for agricultural sustainability assurance are 'benchmarked' against these principles and their underlying criteria. A scheme that covers an adequate number of the criteria meets the 'Qualifying Standard' and can be reported as assurance of the sustainability of a biofuel. It is also possible for a company to arrange its own independent auditing against the Meta-Standard.

Biofuels from 'by-products'[1] are considered to automatically meet the Qualifying Standard for social and environmental sustainability.

For a company to report that their feedstock met the Qualifying Standard there must be robust and reliable audit procedures for agricultural production, and a chain of custody to link the fuel being supplied in the UK to sustainable production.

The RFA is supporting the development of new schemes; has continued its benchmarking of schemes as they enter the market; is engaging with existing schemes to explore improvements; and continuously monitors the effectiveness and compliance with the Meta-Standard of benchmarked schemes.

By demonstrating the importance and achievability of sustainability certification, the biofuels industry can lead a global shift to a more sustainable model of agriculture. Benchmarking schemes can support their expansion and development by providing a clear potential market for certified fuel.

Structure of the report

The report is divided into five sections:

1. Introduction
2. RTFO 2009/10
3. Effects of the RTFO and the fuels supplied
4. Towards sustainable biofuels
5. Concluding remarks

RTFO 2009/10

This section lays out details of the biofuel reported under the Renewable Transport Fuel Obligation and performance against the Government's targets in 2009/10.

The next chapters look at individual suppliers. First, the chosen compliance mechanism (certificate redemption or buy out) of obligated suppliers is detailed, along with the level of certificate revocation and any evidence of fraud. Then the details of the feedstocks used by suppliers are presented.

1 A by-product is a feedstock that represents less than ten percent of the farm or factory gate value.

This is followed by an overview of the actions to promote biofuel sustainability that have been reported by suppliers in their annual reports to the RFA.

After the supplier information, the closing chapter looks at the nature of the verification process and lessons from the year's verification cycle.

Effects of the RTFO and the fuels supplied

This section considers the broader effects of the supply of biofuel in the UK under the RTFO.

The first chapter assesses the effects of the RTFO on greenhouse gas emissions and pinpoints where carbon savings have come from, comparing the relative benefits delivered by different feedstocks from different countries.

The second looks at the extent to which the RTFO has affected UK business and agriculture along with estimates of the area of land used to supply each UK biofuel feedstock reported to the RFA.

The next considers the wider picture and examines how crops grown beyond the UK's borders are being used to produce biofuel for the British market. It considers land usage and takes a closer look at the impact of the RTFO in some of the countries that are major feedstock producers. There are detailed case studies on Argentinean soy, the largest single feedstock, and German oilseed rape, a significant European source of biodiesel.

Towards sustainable biofuels

This section looks at what is being done to drive the sustainability of biofuels and what steps could be taken to further improve their environmental and social performance.

It considers how agricultural practices and choices made by farmers can have significant effects on outcomes, highlighting current and best practice for a number of key country/feedstock combinations.

There is also a chapter on co-operation between the RFA and other European regulators, highlighting the work of the Renewable Fuel Regulators Club (REFUREC), a body initiated and developed by the RFA.

The food and fuel debate is considered in this section, along with an update on the important issue of indirect land-use change. The section concludes with a chapter on the development of sustainability standards and how certification of biofuels continues to evolve.

Concluding remarks

The final section of the report contains concluding remarks from our Chief Executive, laying out our reflections on the year just gone, consideration of the first half of the Year Three of the RTFO and some thoughts on what the future may hold.

Reading the report

Dates

Unless otherwise stated, data in this report relates to the 2009/10 RTFO reporting period, also referred to in this report as Year Two. The conclusions and opinions expressed here are based on the best information available to us at the time of writing.

RED and FQD

The EU Renewable Energy Directive and revisions to the Fuel Quality Directive are expected to be implemented in the UK in the second half of 2011. This report refers to both Directives as they will have a significant impact on the regulation of biofuels in the UK. The RFA is not a policy-making body and any commentary we have made, though based on the best of our understanding, is not definitive nor should it be considered indicative of the expectations of Government. The Department for Transport is responsible for implementing the measures outlined in the Directives and should be contacted for any enquiries regarding implementation or other aspects of biofuel policy.

Content supported by third party studies

The content of this report reflects the view of the RFA. Several chapters and sub-chapters of this document draw on information published in third party studies commissioned by the RFA. These studies are available to download on the Agency's website. Our use of these reports should be taken only to imply that the specific material used reflects our view. It does not necessarily follow that the remainder of the referenced study does so.

Errors and omissions

Every care has been taken to ensure that information in this report is accurate as of 7 January 2011. It is possible that there may be errors or omissions. Should you identify any information in this document that you believe to be erroneous, please inform us by emailing contact@rfa.gsi.gov.uk

If any errors are identified, we will publish errata on our website alongside the report itself. We recommend that readers check our website for errata before reproducing any information from this report.

Performance of the RFA

The RTFO Order calls on us to assess the effectiveness of our performance as the RTFO administrator. This assessment is to include:

- The value for money we provide;
- The effectiveness of advice given to transport fuel suppliers;
- The accuracy of our activities when processing information and evidence, including the number of certificates issued erroneously;
- The effectiveness of our enforcement activities.

Regulating for Sustainability

Since the launch of the RTFO in April 2008, the RFA has successfully administered the first attempt anywhere in the world to regulate the sustainability of biofuels, years ahead of developments elsewhere.

The small team of just over a dozen staff handles the complexities of the RFA Operating System (ROS), providing effective administration of the Order, and dealing with the detail of thousands of batches of billions of litres of biofuel.

The Agency has built up a high degree of institutional expertise as reflected in its reports and management of the RTFO. Our reports, the first authoritative, reliable reports on supplier performance in sourcing sustainable biofuels, have been widely cited in the media, academia and in market research.

The RFA has also been pioneering in the development of the RTFO Meta-Standard reporting system – the first of its kind which went on to influence the development of other standards around the world, in a way beyond the direct engagement of the Agency.

The combined effect of these activities have delivered real, demonstrable changes in the procurement policy of oil companies leading to better environmental and social outcomes. Many of the obligated suppliers' annual sustainability reports outline how they have been influenced by the RTFO, with some reporting a complete overhaul of their biofuel strategy in response to the regulation or conversations with the RFA.

Policy makers from around the world have sought the RFA's advice, much of which has been taken on board and reflected in their legislation.

The Agency also produced the first authoritative, free 'Carbon Calculator', which was also the first to operate with RED carbon defaults. This has helped enable suppliers to actively measure and manage their biofuel sourcing to achieve higher carbon savings.

The RFA worked with industry-leading auditors on the development of verification processes which increase the confidence the Agency and suppliers have in the evidence they provide on sustainability. We have continued to engage closely with auditors of supplier reports to support a consistent approach and continuous improvement.

Our research into the effects of biofuels has also continued to inform the wider debate on biofuels and policy development, including our work in developing the first methodology to proactively avoid indirect land-use change.

Stakeholder Engagement

The RFA has earned a reputation as a fair and effective watchdog among its varied stakeholders. The vast majority of those taking part in surveys, where anonymity allows them to be frank, said the RFA has been doing a good job.

We have put considerable effort into our stakeholder engagement activities, running quarterly workshops, presenting at conferences worldwide and, during 2010 initiating an 'Expert Advisory Group' of key stakeholders to discuss complex issues related to operating the RTFO in detail. These efforts have both increased the knowledge of RFA staff, supporting better decision making, and helped ensure that our stakeholders have a strong voice in our activities.

During 2010 the RFA launched an enhanced website that has been used by visitors from 139 countries including every European nation, and from every continent bar Antarctica, illustrating both the interest and influence of the RFA's work. The website has been widely lauded by stakeholders with almost 94% of those taking part in a recent survey saying they would likely recommend it to others.

Our regular stakeholder newsletter, the 'Digest' has subscribers from European and international parties as well as a strong domestic audience.

Joining up Regulatory Activities

The RFA have also supported Government departments and other public bodies, including Defra, DECC, and the energy regulator Ofgem, in promoting a joined up approach to sustainability for biomass. We have, for example, shared our experience with reporting under the RTFO which was used to inform new reporting requirements under the Renewables

Obligation. Looking ahead, we're exploring with DECC and Ofgem the possibility of extending our carbon calculator to cover bioliquids for use in the Renewables Obligation.

We have also taken action to promote coherence in biofuel regulation at a European level, establishing REFUREC to provide a forum for regulators from all member states to discuss the issues and look for uniform solutions where possible, leading to a lighter burden on industry.

Value for Money

The RFA demonstrates value for money in a number of ways:

We continue to rent our accommodation and IT services from the Department for Transport (DfT). This arrangement provides us with a secure hosting environment for the data collection and storage with no additional cost. We have renegotiated our contract with DfT which has reduced this overhead.

We also continue to use a stand-alone accountancy system and outsource payroll to a bureau. It has proved to be much more cost effective to run a small agency's accounting system on a widely used standard package than to use DfT's system, which is more efficient for larger organisations.

The Agency has continued to show financial prudence. In our first full year of operation 2008/09, we under spent our £1.5M budget by 11.5%. In our second full year of operation we have again been able to achieve a saving of 8.7%.

The majority of our £1.5m budget (£632k) was spent on staff salaries and other remuneration. £574k was spent on IT support and maintenance. In order to reduce consultancy costs, new staff were brought in with database skills. This has allowed us to develop systems in-house, and has also had the benefit of empowering staff and ensuring the systems meet the end-user needs more tightly. Contracts for IT and for the Renewable Fuels Agency Operating System (ROS) have also been renegotiated to achieve further savings.

We have also brought in staff with strong IT skills. This has enabled us to operate our own website at an annual hosting cost of only £400 per year, and design and lay-out our own publications, including this report, at a saving running into tens of thousands of pounds.

All new procurement activities were conducted competitively. Our internal procurement practices were deemed to be acceptable by our internal auditors.

All payments made in 2009/10 were correct and made within the Government's target for public sector organisations of 10 days. Our accounts for 2009/10 were prepared to International Financial Reporting Standards (IFRS), approved by the Comptroller and Auditor General and laid in Parliament before the summer recess, in line with best practice for NDPBs.

Our most recent stakeholder survey (November 2010) demonstrates that our stakeholders are generally happy with our performance. The full results are available on the RFA website.

- 89% said the RFA was an effective or very effective administrator of the RTFO.
- 84% said they were either fairly, very or extremely happy with the quality of our monthly and quarterly reports.
- 83% said they were fairly, very or extremely happy with the response time to queries raised with the RFA.
- 82% said they were fairly, very or extremely happy with the quality of the advice they had been given by the RFA.
- 94% said they would be likely to or would definitely recommend the RFA website to others.
- 75% agreed that our online data collection system was easy to use.
- Among users of the ROS system (a small subset of respondents), 25% disagreed with the statement that the RFA was quick to resolve queries about returns.

By ensuring that staff are well informed and well trained, the RFA has continued to maintain and improve communications with suppliers and stakeholders. The RFA offers advice to stakeholders by a number of methods:

- Conferences, workshops and meetings;
- Telephone conferences;
- Publication of detailed guidance manuals;
- News updates by email and on ROS;
- Website;
- Distribution of the Digest, our monthly online newsletter.

We also ensure we are available for direct contact by e-mail and telephone. We have made particular efforts this year to communicate regularly with suppliers, discussing any issues as they arise.

Accuracy

To issue RTF certificates to suppliers of road transport biofuels, suppliers must report the volume of biofuels supplied and the corresponding carbon and sustainability (C&S) information relating to that fuel. The RFA conducted

'89% of our stakeholders believe the RFA is an effective adminstrator of the RTFO'

regular checks on the data to identify potential errors and sought correction from suppliers throughout the year. This process reduced the need for changes following verification at the end of the reporting year.

The RFA produced monthly reports from the C&S information provided by suppliers to provide updates to stakeholders on the progress of the RTFO. The online reports provided a wealth of detailed information on the origin and GHG effects of the fuels, enabling stakeholders to compare the performance of suppliers. Despite the complexity and volume of the data, monthly reports were produced that were accurate, accessible, and widely referenced both in the UK and abroad. With the second year of data it is now possible to view trends in biofuels on UK roads.

The certificate award system has been updated several times throughout the period to reflect changes in reporting methods and fuel types. Approximately 1.6 billion certificates have been awarded during 2009/10, a 22% increase on the previous year.

In January 2010, due to a software error introduced during a routine upgrade to ROS, we erroneously issued 208,104 additional RTFCs to seven companies; this was less than 0.02% of the total certificates issued during 2009/10. Our checking procedures identified the error immediately and, after securing the agreement of the companies in question, we removed these RTFCs from ROS. As a result of this, we have strengthened our checks when making improvements to ROS.

Buyout Fund

In this period there has been a buy-out fund resulting from two suppliers not redeeming sufficient RTFCs to cover their respective obligations.

The fund is recycled proportionately to suppliers that have redeemed or surrendered RTFCs.

The total value of the fund was £110,448.85 making each RTFC redeemed or surrendered worth £0.0000617 The buy-out fund has been recycled between 22 companies.

Counter fraud

In 2009/10 we continued to develop our understanding of the risks that we face in administering the RTFO and to work closely with HMRC to validate volume data. We are developing a 'Memorandum of Understanding' between the two organisations. Our intent is to determine whether or not HMRC data and the processes used to validate this remain fit for purpose when used, by ourselves, to mitigate the risks we currently face in administering the RTFO and in particular in moving forward when administering any scheme implementing the transport related elements of the Renewable Energy Directive.

As part of this ongoing co-operation, during 2009/10 HMRC allowed the RFA access to increasingly detailed information on the fuels supplied in the UK. This enabled us to develop our understanding of the collection and compiling of excise duty data and to conduct a sector-wide review of potentially obligated companies. As a result of this three cases were detected where suppliers had failed to register with the RFA within 28 days of becoming obligated suppliers. The specific details of these cases and our decisions on whether to impose Civil Penalties are discussed in *Supplier compliance with the RTFO*, page 18.

We have not identified any instances of fraudulent applications for RTFCs in 2009/10.

We have begun a process of working with overseas regulators, especially in Ireland, in order to ensure that cross border movements of fuel are correctly tracked and to prepare for the issues that the introduction of mandatory sustainability standards will bring to such movements.

Preparations for implementation of the Renewable Energy Directive

The RTFO's C&S reporting mechanism was always intended to be a stepping-stone to mandatory sustainability requirements. The forthcoming implementation of the EU RED (expected in the UK in 2011) will make this a reality. The RED means that all biofuels supplied in the UK must meet certain sustainability criteria to count towards the UK's renewable energy targets. Biofuels will have to deliver a minimum 35% reduction in GHG emissions relative to fossil road transport fuels[1]; and biofuel feedstocks must be cultivated such that there is no destruction of carbon stocks or loss of biodiversity.

In January 2010 the DfT asked the RFA to prepare for the implementation of the RED. With our current C&S reporting system operating successfully we were well placed to take on this challenge. In adapting our systems, processes, and guidance documents to be ready for RED implementation we also aimed to help the industry prepare by easing the

1 Biofuels produced in installations operational on 23 January 2008, are exempt from the minimum GHG saving requirement until 1 April 2013. Indirect effects are not currently accounted for.

transition from mandatory reporting against voluntary targets to mandatory sustainability requirements.

From Year Three of the RTFO (from 15 April 2010) we have been operating a 'RED-ready' C&S reporting scheme. To achieve this, in consultation with stakeholders, we adapted our C&S Technical Guidance to be in line with the requirements of the RED as far as possible, leaving out any matters with a high risk of further changes in order to minimise the burden on industry. This included changing our carbon defaults for biofuel chains to those in the RED and utilising the RED GHG lifecycle methodology for those biofuel feedstocks not yet listed. These carbon defaults were also incorporated into our free GHG calculation software tool – the Carbon Calculator – from April 2010.

ROS – our database in which suppliers of road transport fuels enter information required by the RTFO – was also adapted to facilitate 'RED-ready' C&S reporting. We have included four flags to help suppliers identify whether their biofuel is 'RED-ready' according to the following criteria: GHG savings, preservation of carbon stocks, preservation of biodiversity, and overall 'RED-readiness'. These fields are filled in automatically based on C&S information provided by suppliers.

We have also made other behind the scenes changes to the structure and functioning of ROS in preparation for reporting under RED, and we have more planned ahead of implementation.

Our 'RED-ready' C&S reporting has received widespread support from industry. It has benefited industry by highlighting additional sustainability information that suppliers will need to collect from their supply chains. This has enabled them to build additional requirements into their purchasing contracts. In addition, by identifying which of their biofuel feedstocks meet the mandatory RED criteria suppliers have time to make arrangements to either prove sustainability of current supply chains e.g. through meeting a sustainability assurance scheme or by acquiring evidence of previous land-use; or to source alternative biofuels with proven sustainability.

The RFA has also supported the DfT in EU negotiations related to RED implementation, providing formal advice and data. A member of the RFA team has been seconded to DfT during 2010 to aid RED implementation by managing the process changes, the amendments to the RTFO Order, and the DfT consultation on RED implementation.

Our preparations for RED implementation continue. Some of the information needed for full RED compliance remains outstanding. For example, the Commission did not determine definitions of biodiverse grassland or degraded land during 2010. We have been transparent in our guidance to highlight where there are outstanding issues that remain to be resolved. We have provided a framework to enable these outstanding items to be easily incorporated into our 'RED-ready' C&S reporting system to facilitate the transition to RED compliant C&S reporting.

Section 2

RTFO 2009/10

Year of RTFO results

Overall Year Two has seen an upward trend in terms of reported volume, traceability and sustainability of biofuels.

The volume of biofuel used was almost 300m litres higher than in the previous year, representing 3.33% of road transport fuel.

Almost all of the sustainability data supplied to the RFA was verified in Year Two - up to 98.7% compared with the Year One figure of 94.3%.

There was a significant increase in the proportion of biofuel produced according to a recognised environmental standard. This figure rose to 31% from the 20% reported in Year One.

Greenhouse gas savings were up from an average of 46% in the first year of the RTFO to 51% during the period covered by this report. The greenhouse gas savings reported do not include any indirect effects, and may not include all emissions from direct land-use change. Numbers in brackets are figures from 2008/09.

1,568m ↑
litres of biofuel were supplied (1,284m)

3.33% ↑
of UK road transport fuel was biofuel, above the Government's target of 3.25% (2.7%)

98.7% ↑
of the data was verified (94.3%)

71% ↓
of biofuel supplied was biodiesel (82%)

29% ↑
of biofuel supplied was bioethanol (18%)

51% ↑
average greenhouse gas saving was achieved, above the Government's target of 45% (46%)

72% ↑
of requested data was reported, above the Government's target of 70% (64%)

31% ↑
of biofuel feedstocks met the Environmental Qualifying Standard, below the Government's target of 50% (20%)

26% ↑
of biofuel feedstocks met the Social Qualifying Standard (18%)

121m ↑
litres came from feedstock grown to a qualifying sustainability standard (67m)

148m ↑
litres were independently audited to fully meet, or qualify against, the RTFO Meta-Standard (75m)

232m ↑
litres came from wastes and by-products, which automatically qualify as meeting targets (157m)

93% ↓
of fuel from UK feedstocks met the Environmental Qualifying Standard (99%)

Figure 2.1: Greenhouse gas savings of biofuels by feedstock and country of origin

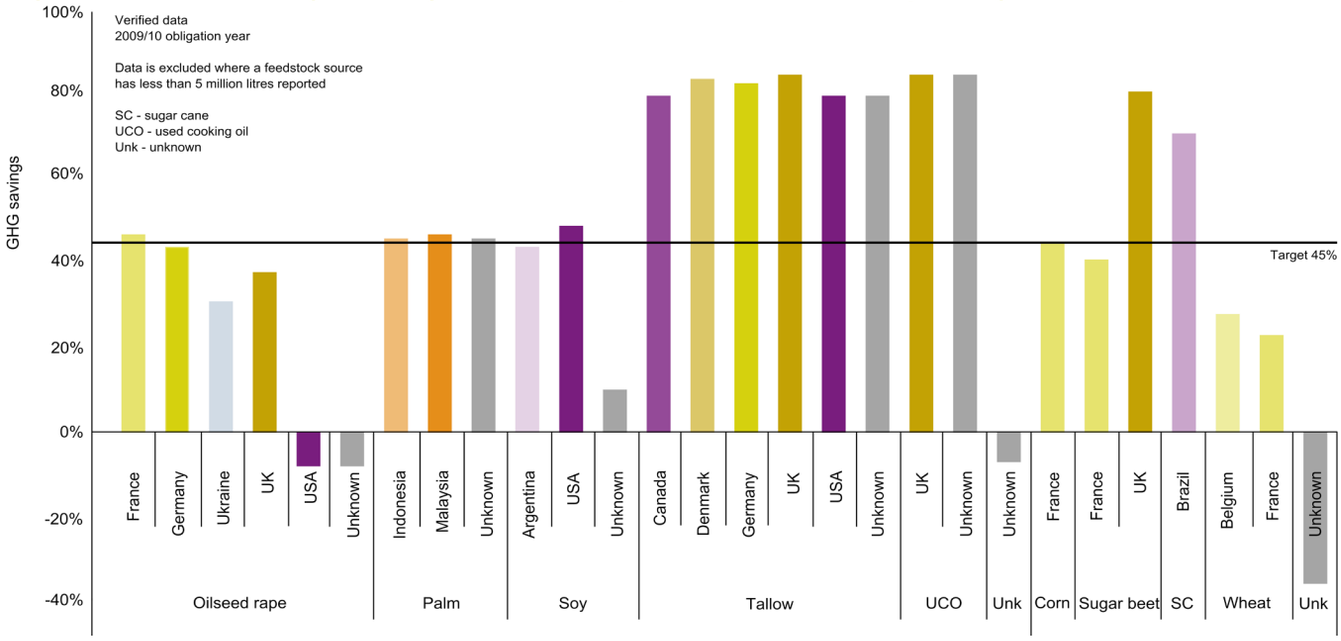


Figure 2.2: Volumes of biofuels by feedstock and country of origin

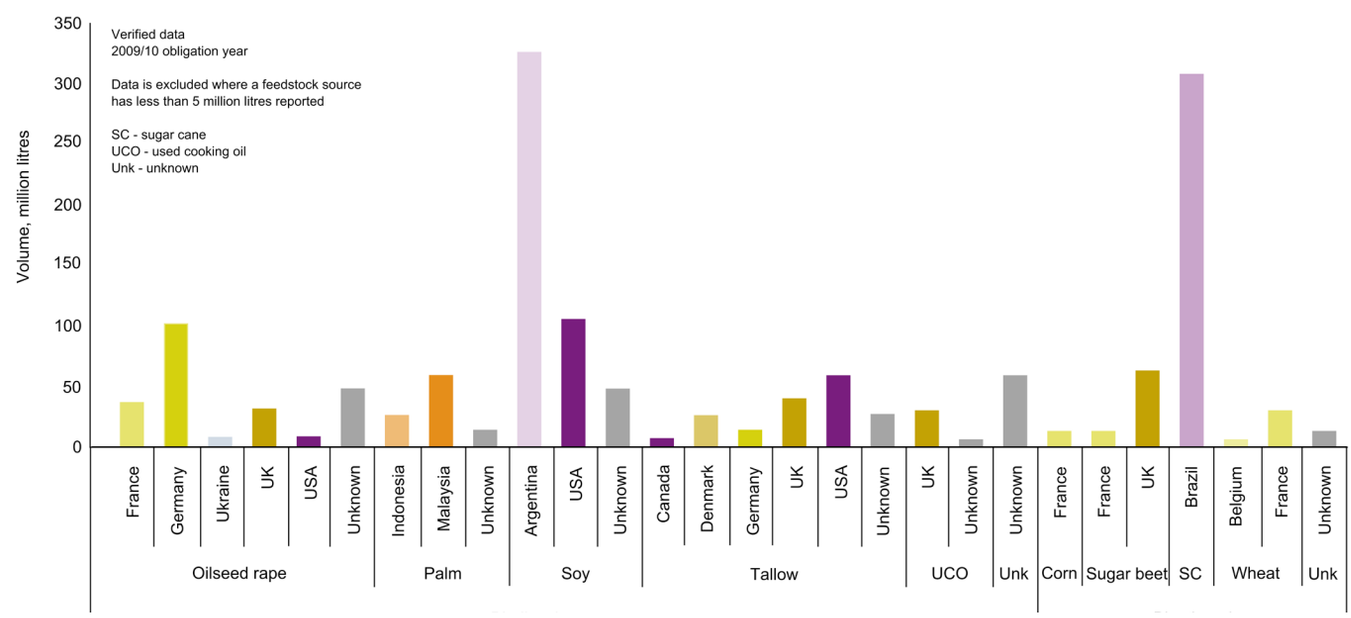


Figure 2.3: Proportion of biofuel meeting sustainability standards

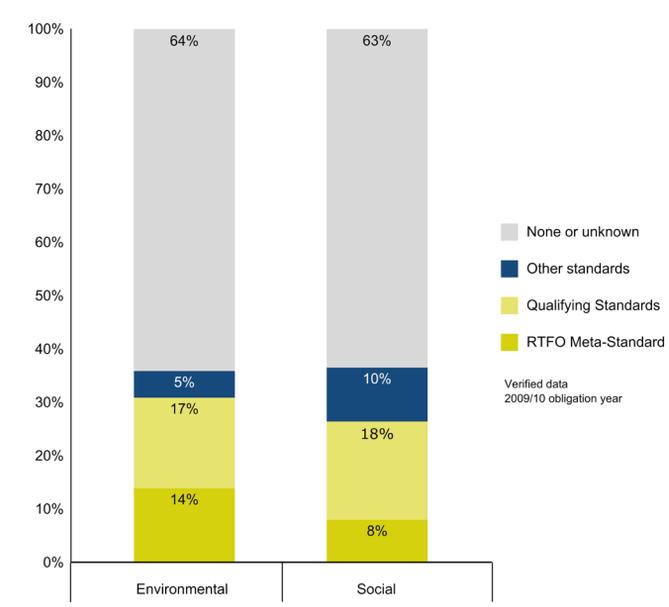
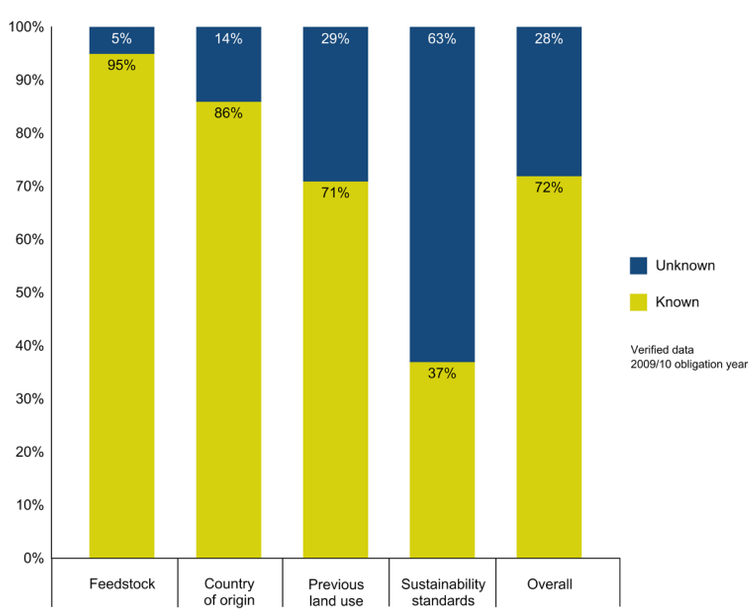


Figure 2.4: Data capture



Supplier compliance with the RTFO

Fuel supply in Year Two

Whilst the overall volume of fuel supplied to the UK dropped in Year Two compared to Year One, due to the RTFO there was an increase in the volume of biofuel supplied, both in absolute terms and as a percentage of total road fuel.

Details on the overall volumes of fuel supplied and RTFCs issued, redeemed and surrendered are given in Table 2.1

Table 2.1: Overview of Year Two obligation

Total fossil fuel reported under RTFO (litres)		45,587,193,267
Total obligated fossil fuel (litres)		45,559,816,688
Obligation met		1,530,400,013
Total certificates redeemed		1,528,938,899
Issued in relation to fuel supplied in	**Year One**	25%
	Year Two	75%
Total obligation not met		1,461,114
Total certificates surrendered		261,528,826
Certificates eligible for a share of the buy-out fund		1,790,467,725

The total obligated volume is different to the total amount of fuel supplied by RTFO account holders for two reasons:

- One company only owned fuel as it is moved back across the duty point for either export to other countries or reprocessing. This company, and the (negative) volume of fuel they owned are ignored when the overall obligated fossil volume is calculated.

- Due to the complexities of the interaction between the obligation and the duty system operated by HMRC, we were unable to allocate 28,241,004 litres of fossil fuel (0.06% of the total supplied by account holders) to the correct company and hence no company was responsible for the obligation on this fuel.

Table 2.2 details the total number of certificates remaining following the redemption and surrendering processes in 2009/10, the total amount of renewable fuel supplied in Year Two and the total number of certificates issued or revoked.

Table 2.2: Balance and issue of certificates remaining

Total number of Year One certificates remaining	99,959,429
Total number of Year Two certificates remaining	414,405,714
Total amount of renewable fuel supplied by RTFO account holders (litres)	1,570,494,030
Total number of certificates issued	1,568,482,143
Total number of certificates revoked	0

Due to the complexities of the interaction between the obligation and the duty system operated by HMRC, we were unable to allocate 2,011,887 litres (0.13% of the total renewable volume) to the correct company and hence no certificates were issued for this fuel.

There was a small difference between the amount of biofuel reported and the amount of C&S data provided. This is comprised of (i) C&S data submitted for seven litres from four large suppliers which is due to rounding errors and (ii) C&S data submitted relating to 6,500 litres of fuel by one company which did not supply that amount of renewable fuel. This data should not have been included in our analysis of C&S data, however we became aware of this issue too late in the analysis process to remove it. This data relates to used cooking oil from the UK and represents less than 0.02% of that feedstock.

Meeting the obligation

For the Year Two obligation, 18 out of 20 suppliers met their RTFO obligation by the use of certificates. One obligated party met its obligation through buying out and one obligated party failed to meet its obligation. Details are given in Table 2.3.

Due to registering as an obligated supplier after 5 October 2010, and therefore after the point by which they could meet their Year Two obligation through the redemption of certificates, Total Additifs et Carburants Speciaux was only able to meet its obligation through paying the required amount of buy-out.

At the time of writing Yorkshire Petroleum Company Ltd (Yopec) was still liable to pay both the amount it owed to the buy-out fund and an interest payment. Should this not be paid, the RFA will take appropriate steps to recover this sum.

The recycling of the buy-out to suppliers who have redeemed or surrendered certificates is discussed in *Performance of the RFA*, page 12.

Table 2.3 Performance of obligated suppliers in Year Two

Obligated suppliers who met their obligation with RTFCs	
Aral Direkt GmbH	Mabanaft UK Ltd
BP Oil UK Ltd	Morgan Stanley Capital Group Inc
Chevron Ltd	Murco Petroleum Ltd
ConocoPhillips Ltd	Petroplus Refining Teesside Ltd
Esso Petroleum Company Ltd	Prax Petroleum Ltd
Greenergy Fuels Ltd	Shell UK Ltd
Harvest Energy Ltd	Topaz Energy Ltd
INEOS Europe Ltd	Total UK Ltd
Lissan Coal Company Ltd	World Fuel Services (Europe) Ltd
Obligated suppliers who met their obligation through buy-out	
Total Additifs et Carburants Speciaux	
Obligated suppliers who failed to met their obligation	
Yorkshire Petroleum Company Ltd	

Civil Penalties

As an independent regulator, the Agency has powers to impose Civil Penalties on those companies that fail to comply with certain requirements of the Order. Failure to meet the obligation or to register within 28 days of becoming obligated renders a supplier liable to a Civil Penalty of up to £50,000 or ten percent of its turnover (which ever is the lesser).

Failure to meet obligation

As Yopec only redeemed certificates equivalent to 12% of its obligation and failed to make the required buy-out payment by the deadline of 5 November 2010 the RFA imposed the maximum Civil Penalty of £50,000 for failure to meet its obligation

Failure to register

As detailed in *Performance of the RFA*, page 11, in Year Two, the RFA became aware of three suppliers who failed to comply with the requirement under the RTFO Order to register with the RFA within 28 days of becoming obligated. The details of the three companies in question and the action taken by the RFA are given below.

Table 2.4: Obligated suppliers failing to register within the deadline

Company	Civil Penalty Decision	Detail
Aral Direkt GmbH	£5,000	HMRC data for Year One unavailable. Company was identified by the RFA. It discharged its obligation for Year Two.
Total Additifs et Carburants Speciaux	£5,000	HMRC data for Year One unavailable. Company was identified by the RFA. It discharged its obligation for Year Two.
Yorkshire Petroleum Company Ltd	No Civil Penalty imposed (for failing to register)	HMRC data indicates that it became obligated in Year One, with a supply of 3,992,555 litres. Company successfully registered but did not discharge its obligation for Year Two. The company identified itself to the RFA, so no civil penalty was imposed.

Revoked certificates and fraud

No certificates relating to Year Two have been revoked and we are not aware of any fraudulent applications for certificates in Year Two.

Certificate trading in Year Two

The RTFO allows fuel suppliers to transfer certificates between the accounts which the RFA maintains for them. Our understanding is that these transfers occur for a number of reasons, including:

- As part of commercial agreements between companies where blended fuel is sold on a duty deferred basis.
- As part of commercial agreements between companies where the fossil and bio elements of fuel are bought at different duty statuses prior to blending.
- As a 'trade' between companies i.e. as a commercial transaction relating to certificates only.
- To 'bulk' together certificates awarded to biofuel only companies in order to increase the number of certificates that can be traded out in any given transaction. Our understanding is that this is regarded by biofuel only companies as being necessary as obligated companies wish to purchase certificates in bulk.
- To enable certificates to be sold via third party traders.

Due to the end of year processes for one obligation period overlapping with the start of the next, providing information about certificate trades that occur within the period 15 April

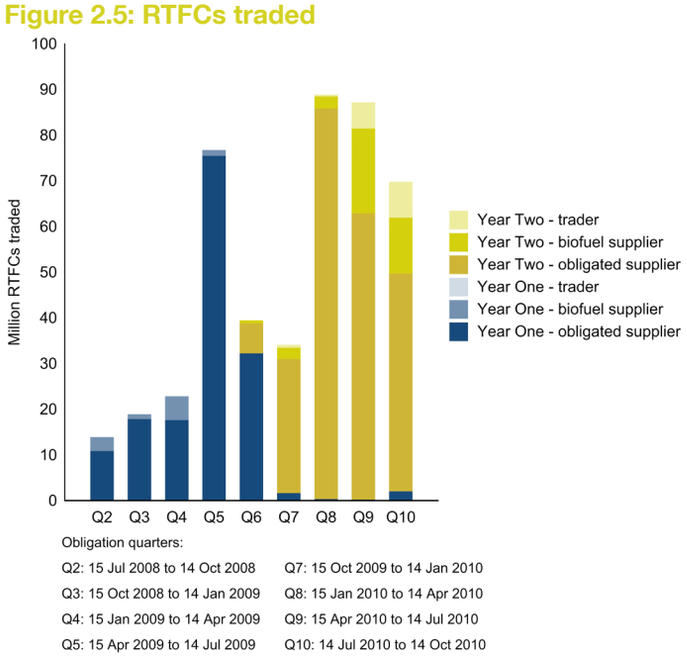
to 14 of April does not capture the full extend of trades relating to any given obligation period. Table 2.5 below gives an overview of how RTFCs are being traded and comparison between the two obligation years illustrates how the market has expanded. Data is up to the redemption deadline (5 October) for each year.

Table 2.5: Overview of Year Two obligation

	Year One (2008/09)	Year Two (2009/10)
Certificates	1,283,552,668	1,568,482,143
Year One certificates traded before Year One redemption deadline	161,185,280	Not applicable
Certificates traded before Year Two redemption deadline	169,011,867	268,588,226
Certificates transferred by respective redemption deadlines	13%	17%
Certificates awarded to biofuel only companies	15,403,810	36,136,240
Certificates remaining in biofuel only accounts at redemption deadline	67%	0.1%

Figure 2.5 below gives an overview of certificate trading.

Figure 2.5: RTFCs traded



Supplier performance

Companies supplying biofuels under the RTFO

Fifty-two suppliers of biofuels for road transport reported to the RFA under the RTFO in 2009/10. Of these, 36 supplied biofuels only; 16 fossil fuel suppliers, all of whom were obligated, also supplied biofuels. Four further obligated suppliers did not supply biofuels. Suppliers must submit C&S data to the RFA on the biofuels they supply under the RTFO. Those applying for over 450,000 RTFCs also have to supply an annual report to the RFA and obtain independent limited assurance over the information supplied (see *The verification process*, page 31 for more details).

Targets

There are targets for three key aspects of the C&S reporting scheme. The targets are not mandatory (and there is no penalty for failing to meet them), but they illustrate the level of performance which is expected from fuel suppliers over the obligation year. The targets increase over time with the expectation that the market for certified sustainable biofuels will expand, and that certified feedstocks will become more widely available.

Table 2.6: Targets for supplier C&S performance

Annual Supplier Target	2008/09	2009/10	2010/11
Percentage of feedstock meeting a Qualifying Environmental Standard	30%	**50%**	80%
Annual GHG saving of fuel supplied	40%	**45%**	50%
Data reporting of renewable fuel characteristics	50%	**70%**	90%

Fossil fuel company performance

Number of targets met

Greenergy, Lissan and Mabanaft, based on their verified data, met all three of the Government targets. Topaz also met all three targets but as a low volume supplier of biofuels was not required to verify.

BP, Chevron, INEOS, Morgan Stanley, Murco and Total failed to meet any of the targets. Prax did not supply a sustainability report as required and therefore the source of all of its fuel was considered to come from unknown feedstock, country and previous land-use. In addition, the carbon emissions were set to the 'unknown' carbon default which assumes a poorly performing biofuel, with emissions greater than fossil fuel. In real terms, there has been a degree of improvement in the sourcing of sustainable biofuels. GHG savings are up, more fuel has been produced according to recognised environmental standards and suppliers have tracked the provenance of their fuels more effectively with a higher degree of data capture. However, the targets against which performance is judged increase year on year to incentivise continued improvement. As a group, suppliers' performance against these targets is down slightly on last year, with more suppliers missing all three.

Table 2.7: Number of targets met by each obligated company

Number of targets met		Obligated company
3		Greenergy
		Lissan
		Mabanaft
		Topaz[a]
2		Esso
		Harvest
		Petroplus
		Shell
1		ConocoPhillips
0		BP
		Chevron
		INEOS
		Morgan Stanley
		Murco
		Total
Unverified	0	Prax

a Topaz, as a low volume supplier of biofuels, wa not required to verify its data.

Greenhouse gas savings

Seven of the 16 fossil fuel suppliers reporting biofuels met the Government's carbon savings target of 45% for 2009/10; a further three were within 10% of achieving the target. One, Prax, did not submit verified data despite a requirement to do so and therefore did not meet the target. Topaz was not required to verify due to the relatively low volumes of biofuel. Murco was the poorest performer with verified information, achieving just four percent GHG savings relative to fossil fuel, compared to an overall average for the RTFO of 51%. (Fig. 2.6a)

Figure 2.6a: Obligated company performance against GHG savings target

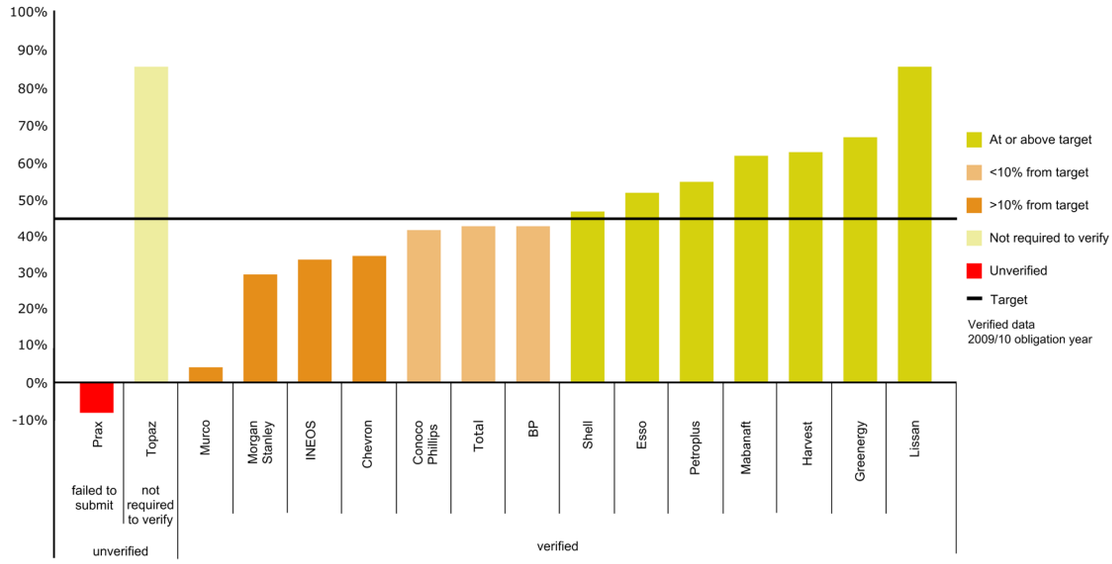


Figure 2.6b: Obligated company performance against environmental standard target

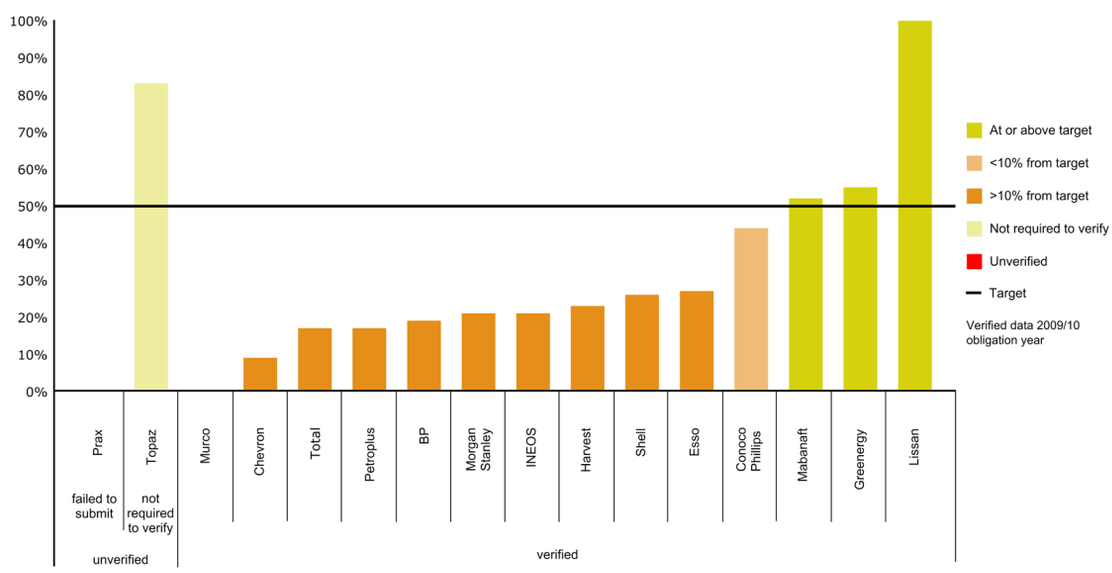


Figure 2.6c: Obligated company performance against data capture target

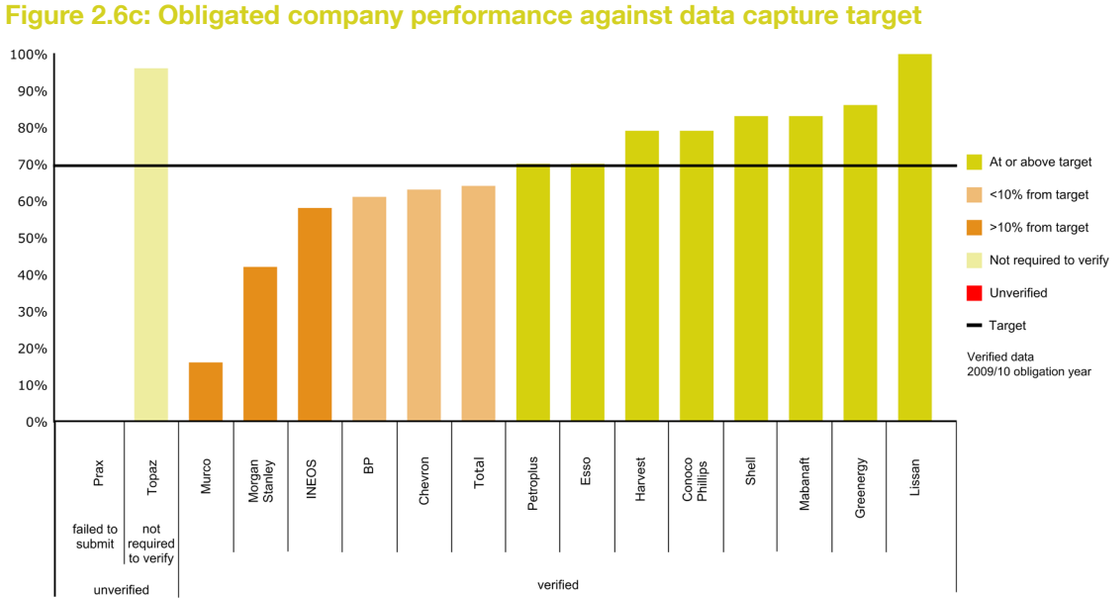


Table 2.8: Fossil fuel supplier performance

	Supplier	Known land-use[a]	Proportion meeting an environmental standard			Proportion meeting a social standard			Greenhouse gas saving	Accuracy level, (0-5)	Data capture
			RTFO	QS	Other[b]/ none/ unknown	RTFO	QS	Other[b]/ none/ unknown			
Fossil fuel suppliers	BP	39%	8%	12%	81%	0%	12%	89%	42%	2.0	61%
	Chevron	63%	0%	9%	91%	0%	9%	91%	34%	1.8	63%
	ConocoPhillips	82%	23%	21%	56%	10%	21%	69%	41%	2.9	79%
	Esso	53%	15%	11%	73%	0%	11%	89%	51%	2.5	70%
	Greenergy	90%	35%	20%	45%	32%	25%	43%	66%	3.7	86%
	Harvest	94%	0%	23%	77%	0%	23%	77%	62%	2.1	79%
	INEOS	58%	0%	21%	79%	0%	21%	79%	33%	1.5	58%
	Lissan	100%	0%	100%	0%	0%	100%	0%	85%	2.0	100%
	Mabanaft	87%	28%	23%	48%	0%	23%	77%	61%	2.6	83%
	Morgan Stanley	32%	0%	21%	79%	0%	21%	79%	29%	1.1	42%
	Murco	0%	0%	0%	100%	0%	0%	100%	4%	0.7	16%
	Petroplus	69%	0%	17%	83%	0%	17%	83%	54%	2.4	70%
	Prax	0%	0%	0%	100%	0%	0%	100%	-8%	0.0	0%
	Shell	85%	4%	22%	74%	4%	22%	74%	46%	1.9	83%
	Topaz	100%	0%	83%	17%	0%	83%	17%	85%	3.9	96%
	Total	54%	2%	14%	83%	0%	14%	86%	42%	2.4	64%

a The only known land uses reported were 'by-product' and 'cropland'.

b Other standards are those which do not meet the requirements of Qualifying Standards or the full RTFO Meta Standard

A number of suppliers collected actual fuel chain data to calculate their GHG emissions. ConocoPhillips used actual data for 22% of its biofuel. For Total that figure was 12% and for Esso it was ten percent. Two to five percent of fuel supplied by BP, Greenergy, Harvest, Mabanaft and Petroplus used actual data.

Environmental sustainability

Only four suppliers – Greenergy, Lissan, Mabanaft and Topaz[1] met the environmental sustainability target of 50%. ConocoPhillips was within 10% of the target. Only one supplier with verified data, Murco, did not report any biofuel meeting the qualifying environmental standard. By not submitting verified data, Prax was also considered to have not supplied any fuel meeting a standard. Aggregated performance was much better than last year, with 31% of biofuel meeting a qualifying environmental standard (Fig 2.6b) compared with just 20% in the previous reporting cycle. This is still some way from the target of 50%. While standards are not yet available for all feedstocks in all locations, suppliers have the option of auditing against the RTFO Meta-Standard.

Data capture

Almost half of the suppliers missed the more challenging data capture target this year, compared with just two in the previous cycle. Prax failed to submit verified data, BP, Chevron and Total were all within 10% of the 70% target while Murco, Morgan Stanley and INEOS missed it by a wider margin. However, the aggregate overall performance exceeded the target at 72% - an improvement on last year's 64%. (Fig.2.6c).

Where did the fossil fuel suppliers source their biofuels from?

Fossil fuel suppliers sourced their biofuels from at least 16 different feedstocks and 31 countries, of which eight feedstocks and 11 countries dominated the mix (Figs. 2.7a,b). These figures demonstrate a significant diversification

1 Topaz, as a low volume supplier of biofuels, was not required to verify its data.

Figure 2.7a: Suppliers' biofuel mix by feedstock

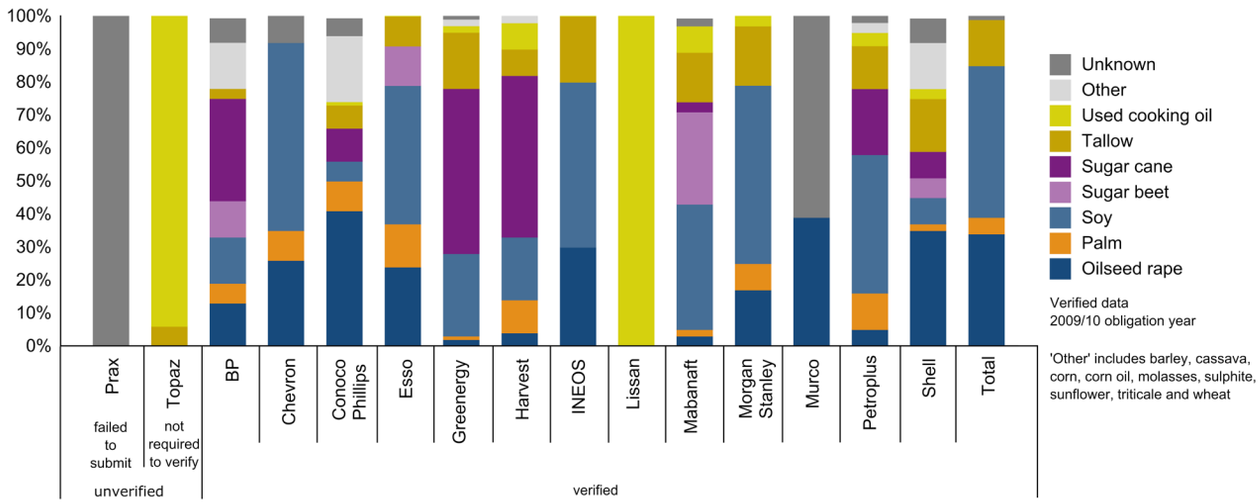
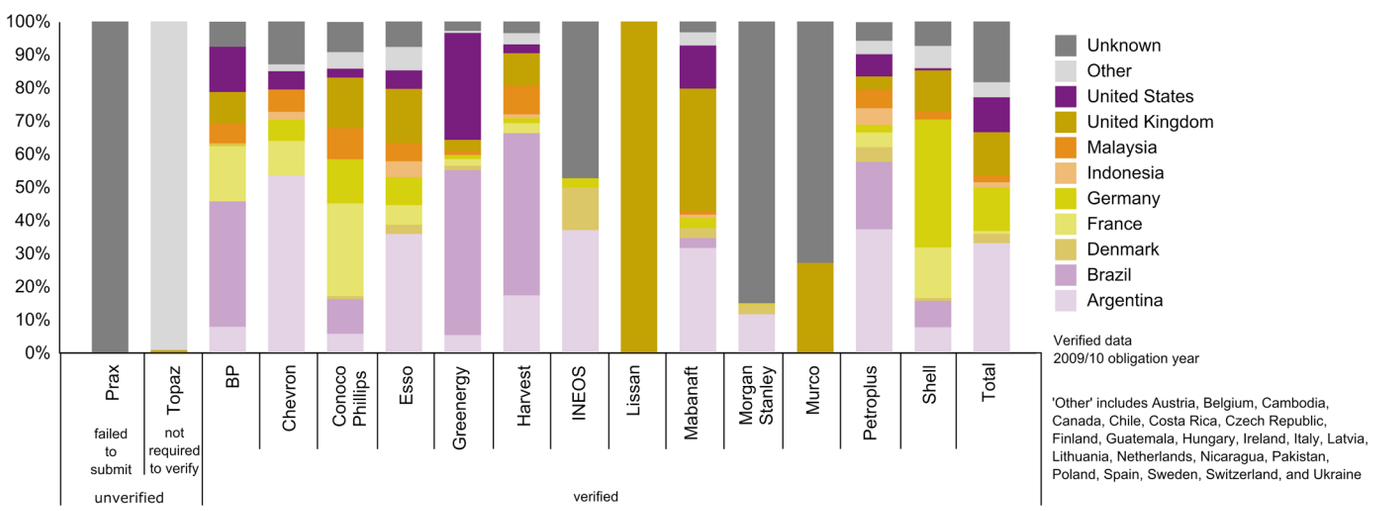


Figure 2.7b: Suppliers' biofuel mix by country of origin



of sourcing compared to Year One, when ten feedstocks from 18 countries were reported. Year Two saw wheat as a feedstock for the first time – two percent of the total. Soy accounts for 30% of the total biofuels with sugar cane making up a further 20%. Bioethanol supply may grow in the future as the industry expands its capacity to supply this fuel to the forecourt.

Several of the obligated suppliers favoured soy, making it the largest single feedstock for biofuel. Among those looking to soy to meet at least a third of their total biofuels were Chevron, Esso, INEOS, Mabanaft, Morgan Stanley, Petroplus and Total. Argentina supplied more soy for biofuels than any other country. Oilseed rape, predominantly from Europe, was the other major feedstock for biodiesel production, comprising at least a third of the biofuels of ConocoPhillips, Murco, Shell and Total. Brazilian sugar cane, the largest bioethanol feedstock, played a significant role for a number of companies including BP, Greenergy and Harvest. Sugar beet, the second largest bioethanol feedstock, represented a significant share of Mabanaft's total. Lissan sourced used cooking oil to meet its obligation; Topaz also relied heavily on this feedstock with a small proportion of tallow making up the rest of its biofuel.

A number of suppliers sourced from two feedstocks with higher GHG emissions than the fossil fuel they replaced: biodiesel made from oilseed rape from the USA has emissions eight percent higher than diesel, while ethanol from Spanish barley has emissions 25% higher than petrol. Oilseed rape from the US accounted for 6.5% of the total biofuel reported by BP, 2.8% of Chevron's total and 1.4% of that reported by Total. Shell was the only company to report Spanish barley as a feedstock, which made up 0.1% of the biofuel supplied by the company. No Pakistani sugar cane was reported this year – this feedstock has emissions 36% higher than petrol and made up 0.08% of Year One's biofuel.

All bar four companies (INEOS, Lissan, Murco and Topaz) supplied biodiesel from palm oil. Only 28% of this was RSPO-certified palm, though that was a considerable improvement on last year's figure of 0.5%. During this reporting period, some sustainability standards covering feedstocks from outside the UK have moved towards becoming operational, but there is still some way to go before achieving blanket coverage. Some standards becoming operational in Year Three seek to be applicable to all feedstocks in all locations. It is already

Table 2.9: Performance of biofuel suppliers whose biofuels include those from agricultural feedstocks

Supplier	Known land-use[a]	Proportion meeting an environmental standard			Proportion meeting a social standard			Greenhouse gas saving	Accuracy level, (0-5)	Data capture
		RTFO	QS	Other/ none/ unknown	RTFO	QS	Other			
British Sugar	100%	100%	0%	0%	0%	0%	100%	82%	4.6	100%
Phoenix Fuels	100%	100%	0%	0%	0%	0%	100%	76%	5.0	100%
Verdant	80%	80%	20%	0%	0%	20%	80%	66%	4.4	96%

a The only known land uses reported were 'by-product' and 'cropland'.
b Other standards are those which do not meet the requirements of Qualifying Standards or the full RTFO Meta Standard.

Table 2.10: Performance of biofuel-only suppliers using only by-products as feedstock

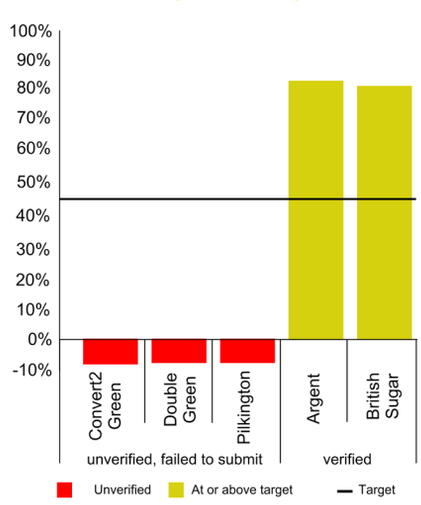
Supplier	Greenhouse gas saving	Accuracy level, (0-5)	Supplier	Greenhouse gas saving	Accuracy level, (0-5)
Argent Energy	84%	5.0	**Greenolysis**	85%	1.9
Associated British Bio-Fuels	69%	2.4	**Kassero Edible Oils**	85%	2.0
Bio UK Fuels (Sheffield)	85%	2.0	**MFS Fuel Supplies**	85%	2.0
Biofuel Refineries	86%	3.9	**Neal Environmental**	85%	3.0
Biomotive Fuels	89%	2.9	**Ozone Friendly Fuels**	85%	2.0
Business Bio Fuels	85%	2.0	**Pilkington Oils[a]**	-8%	0.0
Convert2Green[a]	-8%	0.0	**PRS Environmental**	86%	2.0
Doncaster Bio Fuels	85%	2.0	**Pure Fuels**	85%	2.0
Double Green[a]	-8%	0.0	**Rix Biodiesel**	85%	2.0
Ebony Solutions	85%	2.0	**Rural Development Trust**	85%	2.0
Edible Oil Direct	85%	2.3	**Shepherds Bakery**	85%	2.0
Four Rivers Biofuels	77%	2.0	**UK Renewable Fuels**	85%	2.0
Gasrec	69%	5.0	**Uptown Oil**	85%	2.2
Goldenfuels	85%	2.0	**Veg Oil Motoring**	99%	2.0
Green Fuels	85%	2.0	**Wight Made Diesel**	85%	2.0
GreenerDiesel.com	85%	2.0	**William John Brown**	85%	2.0
GreenFuel Supply Solutions	63%	3.0			

Many biofuel suppliers only use by-products as feedstocks. These fuels do not cause land-use change and automatically meet the Qualifying Standard for sustainability.

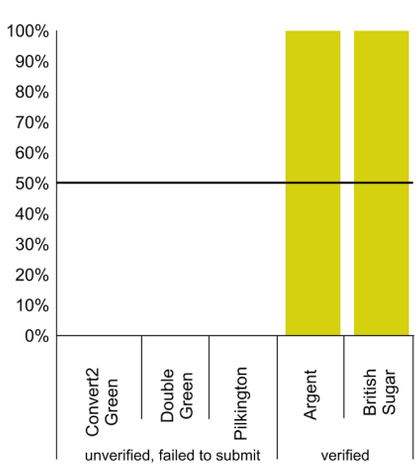
a Companies supplying over 450,000 litres of biofuel are required to submit a verified Annual Report. Those that fail to do so revert to a conservative carbon default for unknown feedstock.

Figures 2.8a,b,c: Biofuel supplier performance against carbon and sustainability targets

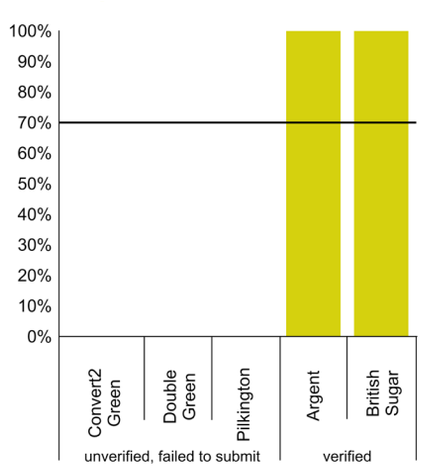
Greenhouse gas savings



Environmental standard



Data capture



possible for suppliers to conduct their own independent field audits against the RTFO Meta-Standard.

It is already possible for suppliers to conduct their own independent field audits against the RTFO Meta-Standard. ConocoPhillips, Greenergy, Petroplus and Shell all reported fuel audited against the Meta-Standard.

No suppliers reported any land-use change associated with the biofuel feedstocks they sourced; however, all except for Lissan and Topaz reported some fuel from agricultural feedstocks for which they did not know the previous land use. (Table 2.8). With no verified data, Prax did not know the previous land use for any of its fuels and, despite a verified set of data, neither did Murco. A further two suppliers were unable to report verified data on previous land use for over half of their biofuels. These two were BP, which reported 61% 'unknown', and Morgan Stanley, which reported 68%. Overall, however, there has been progress on reporting land use compared to last year. This year, the total unknown land use was 29% while last year it was 42%. Sourcing biofuel from land that was not previously cropland is likely to reduce carbon savings and could potentially cause a net overall increase in carbon emissions. Under the RED, suppliers will have to demonstrate that all of their fuels came from land that meets the sustainability criteria; fuels from 'unknown' sources will not be eligible for RTFCs.

Biofuel company performance

Targets met

There were three biofuel-only suppliers that did not meet the sustainability targets. All of them were larger suppliers that brought enough biofuel to market that they were required to verify their reporting. By failing to supply this verified data Convert2Green[2], Double Green and Pilkington Oils all missed all three targets. This resulted in a reversion to defaults for these companies – meaning no fuel was produced according to the requirements of qualifying standards, there was no data capture and carbon emissions counted as 8% higher than equivalent fossil fuels. Verified reports were supplied by Argent and British Sugar, both of which met all three targets.

Where did the biofuel-only suppliers source their biofuels from?

The majority of suppliers in this category, 30 of the 36, sourced most or all of their biofuel from by-products.

In terms of fuel volumes, 85% of the fuel supplied from biofuel-only companies came from used cooking oil in Year One. In Year Two, however, that figure was down to just 6%, largely due to British Sugar's decision to start supplying some of their fuel across the duty point rather than selling all of it to other suppliers before this stage. In Year Two, sugar beet accounted for 78% of all fuel supplied by biofuel-only suppliers – and British Sugar was the only company in this category to supply it.

Argent, Phoenix and Gasrec reported GHG savings using actual fuel chain data for all of their biofuels.

Further details of the feedstocks and countries reported by individual suppliers are available in the Suppliers' Annual Reports to the RFA and in the full verified dataset for Year Two, published on the RFA website.

Table 2.11: Biofuel-only suppliers' biofuel mix

Fuel type	Feedstock	Country	Proportion
Biodiesel	Oilseed rape	United Kingdom	0.8%
	Soy	Brazil	<0.1%
	Tallow	United Kingdom	1%
	Unknown	Unknown	14%
	UCO	United Kingdom	6%
	UCO	Unknown	0.1%
Bioethanol	Sugar beet	United Kingdom	78%
Biogas	MSW	United Kingdom	0.5%

2 Convert2Green did submit a report but it was received after the deadline.

Supplier sustainability work

Major suppliers of biofuel are required to produce an annual report outlining their performance against the sustainability criteria of the RTFO as well as any broader activities they are taking to ensure their supply is sourced in a socially and environmentally sound manner. This applies to all companies claiming in excess of 450,000 RTFCs per year – a cut off which currently covers all obligated suppliers except Topaz and a number of specialist biofuel producers who are not obligated under the RTFO.

The reporting requirement provides an opportunity for suppliers to publicly share the steps they have taken to source biofuels sustainably beyond simple measurement against the Government's high level targets. Conversely, it also highlights where companies have chosen to do little more than supply biofuels and who do not appear to have taken much action on sustainability.

Disappointingly, three suppliers, Pilkington, Prax and DoubleGreen failed to provide a report at all while a fourth, Convert2Green submitted its report after the deadline. In these cases, all the carbon and sustainability information they have provided throughout the year has been counted as coming from an unknown source in our verified dataset – with GHG figures reverting to our default, which assumes a worse than fossil fuel GHG performance.

Beyond the direct scope of the RTFO, the reports are expected to contain information on any breaches of environmental law relating to biofuel supply for which the companies have been prosecuted and any recognised environmental management certification in place (such as ISO 14001).

They also include details of membership of the round table groups developing feedstock standards including the Roundtable on Sustainable Biofuels (RSB), the Roundtable on Sustainable Palm Oil (RSPO), the Roundtable on Responsible Soy (RTRS) and the Better Sugarcane Initiative (BSI).

Membership of these bodies demonstrates a company is engaging with a variety of stakeholders on the issues surrounding the feedstocks they cover, but should not be confused with their securing accredited biofuel. Being on a roundtable is obviously a positive move, but it is entirely possible to sit at the table whilst procuring crops not covered by their certification schemes.

The reports also outline any internal policies companies may have relating to sustainable procurement of biofuels. These vary from aspirational goals outlining a general ethos to the requirements on those further down the supply chain and the companies' expectations of their suppliers in terms of both conduct and accountability.

This year, like last, some companies are showing what can be achieved, while there are others that do not appear to have progressed far from their slow start in Year One.

On balance, however, there are some encouraging signs that a growing proportion of the industry is taking this issue seriously. There are those that are making significant investments in the development of advanced biofuels and others that have altered their procurement patterns as a direct response to the RTFO. Faced with tougher targets for C&S performance, some have stepped up to the challenge while others have apparently chosen to ignore them.

Performance of individual companies is considered below.

Met three targets

Argent

Makes fuel from used cooking oil (UCO) and tallow that meets European Standard EN14214. It has never made or sold anything other than biofuel made from by-products, which automatically count as meeting the qualifying level of sustainability. It also runs its fleet on biodiesel and is investigating ISO 14001 certification of its environmental policy. The boiler for Argent's plant can be fired by traditional gas oil or biofuel oil. During 2009 the company almost eliminated the need to burn gas oil by making adaptations to the boiler and the burner. To reduce the carbon intensity of the fuel it produces further, Argent has applied for planning permission for on-site wind turbines to provide enough electricity for all of the plant's needs.

British Sugar

Uses sugar beet from the UK as its only feedstock, all of which is accredited by the ACCS standard. It is working on producing more ethanol with less sugar to further improve its efficiency. Its Wissington factory is an excellent example of sustainable production in action (see *Case studies* at the end of this chapter). Its ethanol production site is ISO 14001 compliant.

Greenergy

The company continued to demonstrate a good level of commitment to sustainability and was able to highlight a number of progressive initiatives. Among these is an extensive programme in Brazil where their sustainability audit programme uses the full criteria of the RTFO's Meta-Standard (see *Case studies* at the end of this chapter). The report goes into some detail on efforts to source sustainable feedstocks.

‘Most suppliers appear to have recognised that sustainability will cease to be optional in the future and have at least begun gearing up their operations to reflect this.’

Among these is investment in their biodiesel plant to enable the processing of tallow and UCO.

It took steps to avoid palm oil, one of the more controversial feedstocks, and that which it did purchase was produced under the RSPO standard.

Lissan
Only uses locally-sourced UCO. A company statement says that it does not produce any biofuels from crops or farmland. This use of by-product-only biofuel allows it to meet all three sustainability targets.

Mabanaft
Says it has championed the use of tallow and UCO since before the RTFO and this has helped to deliver a good performance overall. More than a third of its biodiesel comes from these two by-products while the vast majority of its ethanol is from sugar beet, which has resulted in carbon savings surpassing the target by more than 10%.

Met two targets

Esso
Parent company ExxonMobil says it is investing $600m in researching algal biofuels over an unspecified period. Esso’s in-house environmental management system is ISO 14001 accredited. Its report also lists a number of aspirational sustainability targets saying its goal is to achieve excellent environmental performance and to operate responsibly by implementing scientifically sound and practical solutions. The challenge of providing energy to support growth while reducing greenhouse gas emissions, is recognised. The report states that environmental considerations form part of Esso’s wider operations management systems.

Harvest
Says it focuses on waste or recycled feedstocks giving it a good sustainability profile. Statistically its submissions to the RFA show 33% of its biodiesel was from was from waste, while over 95% of its bioethanol came from sugar cane with carbon savings of 71% – a relatively high saving compared with most agricultural feedstocks. It has developed its own biofuel production plants in several European locations, which it states gives it greater control over supply chain and feedstock. Harvest also says it has been purchasing more feedstock direct from farmers, which again improves traceability and data capture. It is a member of RSPO.

Petroplus
Data capture has fallen since the last reporting period, but the company says that this is because it has been working on new supply chains focused on ethanol and that as these business relationships mature traceability should once again increase. Its move into ethanol supply has already delivered an improved GHG performance. It is a member of RTRS and RSPO. It has also joined the Northeast Biofuels cluster of companies which is developing an action plan to improve carbon and sustainability performance of crops grown in the region through its Growers Group.

Shell
Says biofuels represent the most realistic commercially viable way of cutting carbon emissions from transport and believes it is the world’s largest distributor of biofuels. It has a number of dedicated biofuel research facilities looking at advanced fuels from crop wastes, non-food crops and other sources. With the stated aim of influencing the wider industry and raise sustainability standards, Shell sits on all the major roundtables for the development of sustainable biofuels – the RSB, RSPO, RTRS and BSI. It is one of the few suppliers to have carried out its own audits against the RTFO Meta-Standard. Says it has internal systems, policies and resources in place to assess potential sustainability risks in its biofuel supply chain, to implement controls and to monitor and report progress.

Met one target

ConocoPhillips
Says it plans to spend $22.5m over eight years for broad biofuels research, with an additional $5m for an algae research project. It says its Environmental Management Strategy at its Humber refinery is ISO 14001 compliant. It has outlined a number of aspirational principles. These include commitments to increase the availability of ever-cleaner energy, positively impact communities wherever it operates and to minimise the environmental impact of its operations.

Met no targets

BP
Says it is committed to the development of sustainable biofuels but that its procurement policy of buying biofuel from international aggregators and traders makes tracking C&S data difficult. It states that it has been investing time in strengthening relationships with producers and this will lead to a better data capture and evidence of sustainability in this area in future. It is engaged with most of the major biofuels round tables and is a member of BSI, RSPO, RTRS and RSB. BP is one of a handful of oil majors investing heavily in the development of advanced biofuels. As stated in their report last year, they have a budget of $500m over 10 years to research bioenergy, with some of this earmarked for biofuel research and development. Notable research projects include work with DuPont to commercialise biobutanol which

has a higher energy value than ethanol and can be used in higher blends.

Chevron

Has said it will source more biofuels meeting sustainability standards as those standards become more widely implemented and commercially operational. It has backed up this commitment with a degree of action, supplying around nine percent of its biofuel as meeting a qualifying environmental standard during Year Two, having supplied no certified fuel in the first year of the RTFO. It is working with the RSB through its membership of the International Petroleum Industry Environmental Conservation Association (IPIECA) and with the European Petroleum Industry Association (EUROPIA) to come up with ways to track and improve the chain of custody and better enable sustainability certification of crops. It is funding research into lignocellulosic and lipid feedstocks. Its report says this is expensive and time consuming as feedstocks that look promising in laboratory trials do not always scale up well.

INEOS and Morgan Stanley

INEOS Refining has to split its obligation and reporting between accounts held by Morgan Stanley, and INEOS Europe. It has developed its own sustainability standard that it expects suppliers to follow – though this should not be confused with qualifying crop standards. Its Grangemouth refinery has ISO 14001 certification. It says it buys its biofuel from others and has no direct relationship with crop producers and therefore cannot comment on its sustainability standards.

Murco

Aims to exclusively purchase oilseed rape with as short a supply chain as possible. It said it made these changes following recommendations from Year One on traceability and fuel quality (see *Case studies* overleaf). It has had issues with verification which it says it hopes to tackle by buying biofuel made solely from UK oilseed rape. Since October 2009 the report states that Murco has bought only EU rapeseed, which has amongst the best carbon defaults under the RED of any biodiesel that does not come from a by-product. Before this, its supply was based on soy, palm and oilseed rape.

Total

Says it has taken a cautious approach in order to ensure biodiesel it procures meets quality and safety standards. It is now accepting biodiesel from a wider range of feedstocks after testing by its specialists which it says may lead to improvements in C&S. It hopes to procure more UCO in the future and has added tallow to its list of approved feedstocks.

Conclusion

Compared to last year, more suppliers have taken the opportunity to highlight their engagement on C&S issues related to their biofuel supply. These successes remain modest in some cases, and performance against the RTFO carbon and sustainability standards remains, for some of the companies, disappointing. The reports reveal key divisions within the industry, showing those who have made efforts to integrate sustainability into their business model, those who are matching big expectations of biofuels in the future with big budgets to research them, and those who do not go much beyond the business-as-usual model. Despite this variation, there seems to be a growing willingness to tackle the issue and real, clear examples of the RTFO helping to move this process along. While the sustainability targets under the RTFO may be voluntary, those in the Renewable Energy Directive are not and, come implementation, biofuel supplied to the EU will have to meet those standards or it will simply not count as biofuel.

Most suppliers appear to have recognised that sustainability will cease to be optional in the future and have at least begun gearing up their operations to reflect this.

Who failed to report?

A number of companies failed to submit an Annual Report and verification statement for 2009/10:

- Convert2Green [a]
- Double Green [b]
- Pilkington
- Prax [b]

The RFA currently has no powers to take action against such failures. Verification is a requirement of the forthcoming RED and therefore this is one area of the RTFO that will need to be revised to achieve RED implementation.

Companies supplying below 450,000 litres of fuel were not required to submit reports or have their data verified.

[a] Submitted its report after the deadline, meaning that all data is counted as unverified and feedstock recorded as 'unknown' with default sustainability perfromance. The late report has been published on the RFA's website. Convert2Green's verifiers accepted that it had supplied 100% UCO. Had this information been supplied on time, the company would have automatically met all three sustainability targets

[b] Failed to submit a report for second year running.

Case Studies

Sugar refinery demonstrates sustainability

British Sugar's refinery in Wissington, Norfolk is not only huge but it also illustrates what can be achieved when GHG saving is an integral part of the design. Processing beet in vast quantities and converting some of the sugar into bioethanol, the plant recycles soil and stones washed from the feedstock for the construction and gardening industries and goes to great lengths to reduce wastage. Beet pulp is used for animal feed and to produce energy at the factory's combined heat and power (CHP) plant while proteins extracted from the processing that would otherwise have gone to waste instead become a major ingredient in fish food. Hot water and CO_2 from the CHP plant are pumped into the adjacent greenhouse – among the largest in Britain – where they help speed the growth of over 80 million tomatoes per year. Bioethanol from the plant achieves an average GHG saving of 82%. British Sugar also requires all of the farmers and growers who supply its beet to be signed up to the ACCS (now part of Red Tractor Farm Assurance) – one of the Qualifying Environmental Standards recognised by the RFA for companies reporting against sustainability targets.

Suppliers embrace RTFO Meta-Standard

Our year two provisional results show a near doubling of fuels meeting the RTFO Environmental Meta-Standard, the standard by which we judge all others, to 14%. This is due in part to two major fuel suppliers who have addressed the lack of existing feedstock standards by undertaking independent audits of their biofuel feedstocks against the criteria of the Meta-Standard directly. Greenergy and Shell have been supplying Brazilian sugar cane that has been independently audited and found it to meet the full RTFO Meta-Standard while Shell has also begun to do the same for its German oilseed rape.This is an encouraging sign that may have much wider implications, particularly in areas where third party standards have yet to be developed.

The verification process

Introduction

Under the RTFO, where over 450,000 litres of biofuel per annum have been supplied by a supplier, the reliability of carbon and sustainability information submitted to the RFA must be demonstrated through independent verification. The verifier's statement must be submitted to the RFA alongside each supplier's Annual Report. Verifiers must be qualified to carry out audits against the International Standard on Assurance Engagements (ISAE 3000).

The RFA has produced comprehensive guidelines on verification under the RTFO. These include testing procedures, the kind of evidence that should be obtained, and potential assurance activities. One of the key principles of the RTFO system is that a verifier should be able to trace C&S claims back to the original source of the data. For verification purposes, there needs to be a 'chain of custody' in place all the way down the supply chain where appropriate records are kept of material flows and C&S information. The only exception to this is where an approved 'Book and Claim' chain of custody scheme is used.

Context

Though it has now completed two full years in operation, the RTFO remained the world's only nationally administered carbon and sustainability reporting system for biofuels during 2009/10. That is set to change shortly as Member States across the EU implement the Renewable Energy and Fuel Quality Directives, which place new requirements for reporting and verifying information on the carbon and sustainability performance of biofuels. Over the past two years, suppliers into the UK have gained experience in developing operational procedures to enable the tracking of C&S information through their supply chains. Experience with being audited has also helped inform suppliers of the level of evidence required.

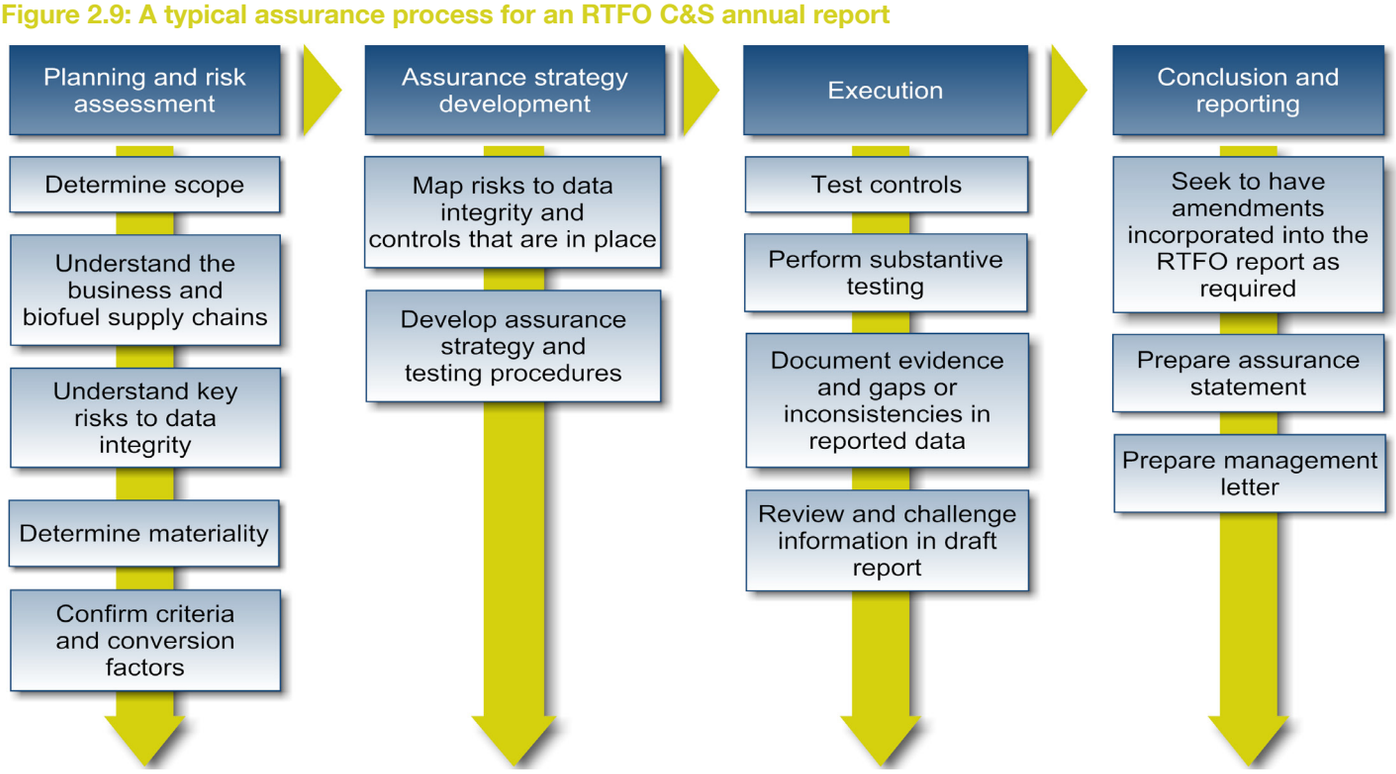
Results

Suppliers were required to produce their annual reports with verification statements by 28 September 2010, in respect of their data for the 2009/10 obligation period. As was the case in the first year of operation, in many cases the verification process resulted in changes to data suppliers had provided during the year. This typically resulted from verifiers finding that insufficient evidence was available to support some of the C&S claims they had made about their fuels.

RTFO aggregate results

At the aggregate level, the changes to performance against the Government targets from the provisional data to the fully verified results are detailed below. Overall, performance has dropped slightly, though information reported to the RFA during the year was in the main representative of actual performance.

Figure 2.9: A typical assurance process for an RTFO C&S annual report



Source: Ernst & Young LLP

This represents an improvement on last year, where the verification process resulted in reductions in the performance against all three targets of between one and four percent.

Table 2.12: RTFO aggregate results

Annual supplier target	Target 09/10	Provisional	Verified
Percentage of feedstock meeting a qualifying environmental standard	50%	33%	31%
Annual GHG saving of fuel supplied	45%	51%	51%
Data reporting on renewable fuel characteristics	70%	72%	72%

In addition to changes to the figures resulting from the verification process, the RFA changed data to 'unknown' where suppliers failed to provide an assurance report. This applied to just one obligated supplier this year and three non-obligated suppliers (representing 1.1% of supply volume).

A small portion of the data from which these results are derived was not required to be verified (0.2% of total biofuel volume). This is because companies supplying less than 450,000 litres of biofuel per annum are exempt from submitting a verified Annual Report.

The net result confirms that two of the Government's three targets have been met as per the provisional data. The proportion of fuel meeting environmental standards fell after verification from 33% to 31%.

Company results

As in the first year of the obligation, the verification process affected suppliers to varying degrees. At the high level, most (ten) were unaffected in terms of whether they met the Government's targets. Two suppliers improved their performance, and four suffered reductions.

The two most affected companies were INEOS and Morgan Stanley (both operating out of the Grangemouth refinery), which each went down from meeting two targets for their unverified data to meeting none following verification. Explaining the reduction, the INEOS report stated that:

'Throughout the obligation period INEOS submitted sustainability information to the RFA based on sustainability declarations received from our biofuels suppliers for the 2009-10 obligation period. We appointed reputable auditors to carry out the verification on the sustainability information we supplied in line with the relevant RFA guidance. However this found insufficient evidence at our biofuel suppliers to allow all of the certification we had received to be successfully verified. INEOS has therefore subsequently amended the information supplied to the RFA to be consistent with the findings of the verification.'

The lack of evidence to substantiate claims by suppliers further up the supply chain was frequently cited as the reason for changes to C&S data following verification.

Table 2.13 illustrates the changes, and which verifiers conducted each assurance engagement. Details of the performance against each target for each supplier are shown in Figs. 2.10a,b,c.

Table 2.13 Effect of the verification process on supplier performance

Number of targets met	Fossil fuel company	Verifier	Number of targets met (unverified 12 month report)	Change from unverified report
3	Greenergy	PWC	3	—
	Lissan	SGS	3	—
	Mabanaft	SGS	3	—
	Topaz	Not verified[a]	3	—
2	Esso	SGS	1	↑
	Harvest	SGS	2	—
	Petroplus	Inspectorate	1	↑
	Shell	E&Y	2	—
1	ConocoPhillips	E&Y	1	—
0	BP[a]	ERM	1	↓
	Chevron	SGS	0	—
	INEOS (Europe)	E&Y	2	↓
	Morgan Stanley	E&Y	2	↓
	Murco	KPMG	0	—
	Total	E&Y	0	—
Not verified	Prax	Not verified[b]	1	↓

a Topaz was not required to provide a verifier's report as it reported less than 450,000 litres of biofuel.

b Prax failed to submit a verifier's opinion.

Figure 2.10a: Greenhouse gas savings before and after verification

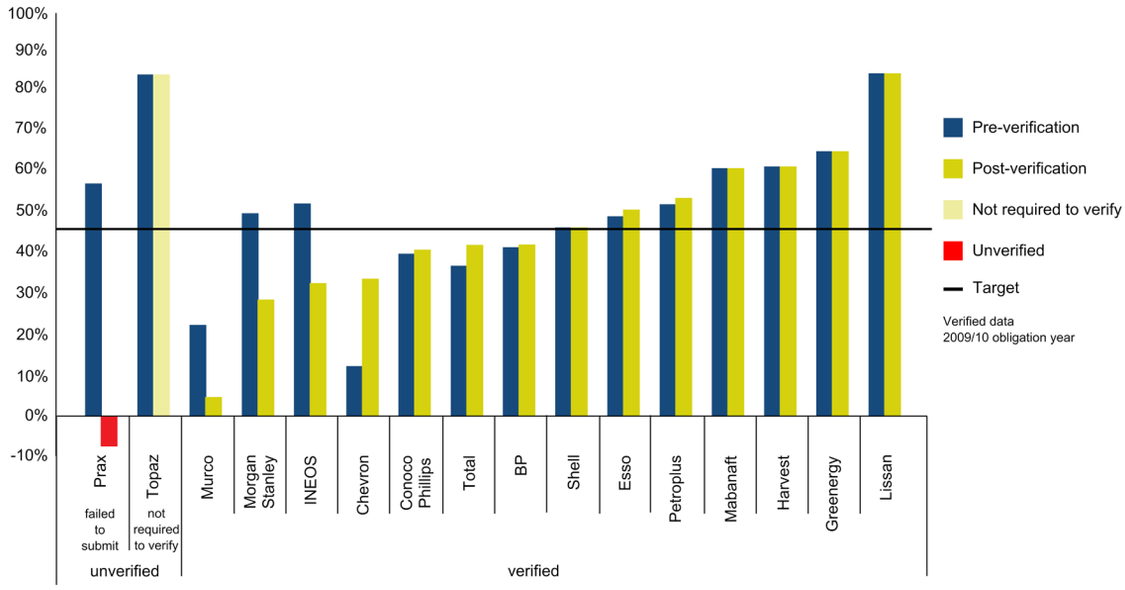


Figure 2.10b: Environmental standards before and after verification

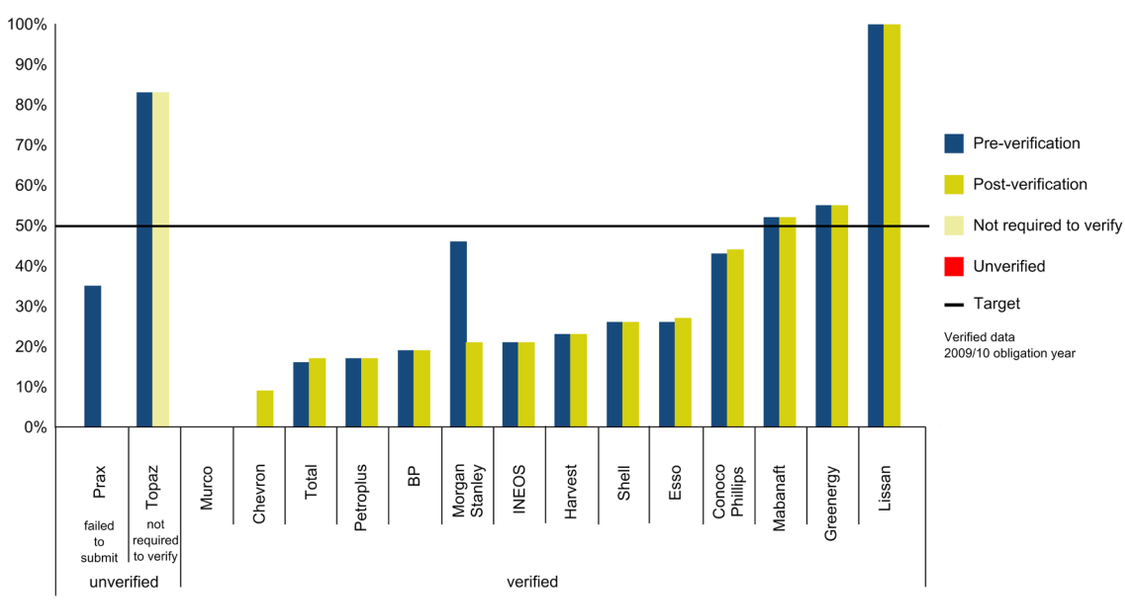
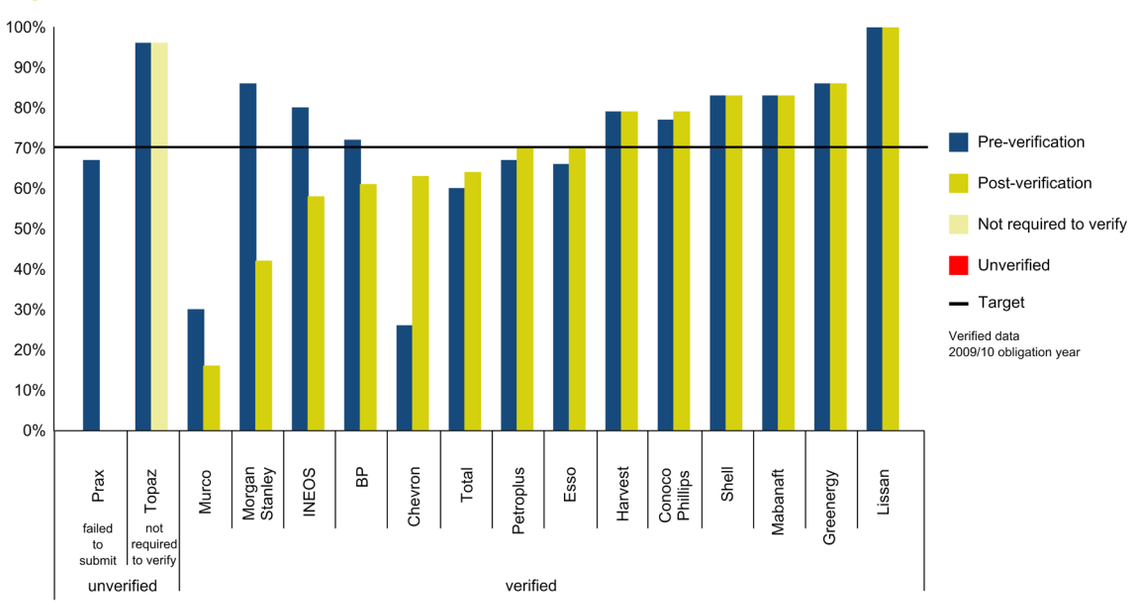


Figure 2.10c: Data capture before and after verification



'The RFA verifiers' guidelines have gone some way to encourage a consistent approach to verifying C&S data in what remains a new area'

Obligated suppliers' performance pre- and post-verification

Unlike the first year of the obligation, all suppliers who provided a verification statement successfully achieved the limited assurance required for their C&S information for 2009/10. However, there were significant changes to the data of some suppliers even where their overall performance against meeting the targets was unaffected. For example, Murco made significant changes, reporting 'unknown' for over 61% of their feedstock following verification, compared to 53% before. Murco were one of the companies that received a qualified opinion in 2008/09. BP suffered a significant drop against the data capture target falling from 72% to 61%. This was primarily due to insufficient evidence of previous land use, for most biodiesel feedstocks, and for bioethanol feedstocks sourced from outside the EU.

Prax was the only obligated supplier who failed to supply a verified Annual Report for 2009/10. Prax also failed to provide a verified Annual Report for 2008/09.

Verifiers' statements

The independent assurance statements provided in the company reports are a critical part of the RTFO reporting scheme. The auditors determine which C&S data can be substantiated, and their report provides an insight to the work they have done to reach their conclusions. Once mandatory criteria are introduced, the auditor's assessment will determine whether biofuels can count towards a supplier's obligation, and thus have a potentially significant financial consequence for the firm they are auditing. This can be expected to place more pressure on auditors to 'accept' data. The quality of verification, and the need for a consistent approach between auditors is therefore set to become simultaneously both more challenging and more important.

The RFA verifier's guidelines have gone some way to encourage a consistent approach to verifying C&S data in what remains a new area. However, as PricewaterhouseCoopers notes in its statement on limitations, 'The absence of a significant body of established practice on which to draw' presents a challenge to consistency.

It is difficult to assess the extent to which auditors have taken a uniform approach to verification, but there are indications that they may not have done so. For example, it is notable that whilst a number of the auditing statements refer to having to 'downgrade' some data because insufficient evidence was available to substantiate the claims, some auditing companies appear not to have required any data to be downgraded.

One way to encourage a level playing field is to ensure that auditors conduct a similar level of investigation and that audit statements are more explicit and transparent. In considering the statements this year the RFA paid particular attention to what activities auditors undertook to reach their conclusions. Important differences in work undertaken appear to have included the extent to which auditors investigated the chain of custody. For example, some auditors included visits to upper tier suppliers as part of their audit process, whereas the majority do not appear to have done so.

To further encourage a consistent approach, the RFA is developing a template for assurance statements with verifiers to increase transparency in the verification process. The intention is to ensure that statements are more explicit in terms of what activities have been undertaken, both in terms of what has and has not been done, and what, if any, amendments have been made.

Overall there was an improvement in the quality of the statements for 2009/10 compared to the previous year in terms of explaining the audit process. However, auditors did accept some data that was clearly incorrect (for example, biofuel from a crop-based feedstock with previous land use reported as by-product), indicating that the audit process itself is not currently as reliable as it might be.

Conclusions and implications for mandatory requirements

The second year of verification has, perhaps not unsurprisingly, gone somewhat more smoothly than the first. In particular, verifiers required that unsubstantiated data was 'downgraded' rather than providing a qualified opinion on all data supplied. However, it is not clear that all auditors are conducting their activities in an entirely consistent way, or that they are coming to the same judgements based on similar evidence. The onset of mandatory C&S requirements throughout the EU can be expected to place a new emphasis on both the quality and consistency of auditing in what remains an embryonic area of assurance.

Effectiveness of carbon and sustainability reporting

Context

Carbon and sustainability reporting was introduced at the outset of the RTFO to enable the effects the RTFO to be measured, and to encourage suppliers to source the most sustainable biofuels. It was designed as a 'stepping stone' to mandatory C&S requirements.

The Renewable Energy Directive contains both minimum C&S requirements and reporting on the effects of biofuel feedstocks on air, soil and water.

Focussing on information supplied in company reports, this section assesses the extent to which C&S reporting has fulfilled the original objectives, and implications for RED implementation.

Supplier reports

All bar one obligated suppliers provided a verified Annual Report as required. Suppliers have generally been at least moderately successful in pulling more information through their supply chains and thus baseline data to asses the impacts of the RTFO has improved. For example, performance against the 'data capture' target (which measures how much is known about the biofuel, such as the feedstock and country of origin) improved from 64% in Year One to 72% in Year Two.

Whilst data gathering is an important aspect of reporting, the primary objective is to improve actual performance. Although, as with Year One, performance between suppliers varies widely, this year's reports provide good evidence that many suppliers are focussed on improving the sustainability of fuels that they source. For example, a number of suppliers reported focussing their procurement on sourcing 'by-products', such as used cooking oil. These feedstocks typically have a better carbon and sustainability profile than those derived from crops, but can require more demanding processing to address quality issues. The proportion of by-products moved up from 12% in Year One to 15% in Year Two (and for the first quarter of Year Three to 21%).

Some suppliers also cite avoiding certain biofuels with poor GHG performance under the RTFO guidelines. For example Greenergy state that they avoided US corn, despite attractive prices, due to the negative carbon savings this feedstock has using RFA default values.

Two suppliers report developments on their implementation of the RTFO Meta-Standard through independent auditing. Greenergy report that 70% of their Brazilian ethanol met at least the environmental qualifying standard level, and Shell reported that 6.6% of their oilseed rape met the full RTFO Meta-Standard for the first time. The Meta-Standard provides assurance that core sustainability principles including biodiversity protection are adhered to. Although auditing in and of itself doesn't necessarily affect behaviour on the ground, the process can encourage actual improvements. Greenergy, for example, state that Brazilian sugar mills implemented improvements, sometimes at considerable expense, to meet the Meta-Standard criteria.

Public reporting influence

One of the more controversial elements of the RTFO reporting scheme, at least from the perspective of suppliers, has been the public nature of reports and measurement of performance against Government targets. Some suppliers have questioned the 'fairness' of how the targets operate. For example, Esso have complained that, because the reporting applies at the fuel duty point, the sustainability characteristics of fuels that they source after duty has been paid are not reflected in Esso's measured performance.

Nevertheless, the majority of suppliers were keen to emphasise an improvement in their absolute performance against the targets compared to the first year, and there was evidence of the targets acting as a stimulus to improved performance. INEOS, for example, stated that the RFA's quarterly reporting was used '*as a means of internally benchmarking our performance relative to the wider industry...*'. Murco also stated that they responded to the RFA's Year One report by changing their procurement policy - moving exclusively to sourcing rapeseed and developing shorter supply chains to develop chain of custody and traceability.

Supporting sustainability standards

Suppliers were asked to include information in their reports on initiatives to improve the sustainability of feedstocks, including membership of sustainability standards. Disappointingly, only a handful of suppliers have supported standards through membership of a standards body – and these are the same suppliers as last year. The only development to Table 2.14 on standards membership is the addition of the new ISCC standard.

Supply of certified fuel from these standards has increased as some of the standards have moved to a more operational footing. In particular, whereas only one obligated party supplied any verified RSPO palm oil in the first year of the obligation, eight of the 11 obligated suppliers that supplied palm used at least some RSPO in 2009/10.

'The RTFO reporting system has played a useful role in providing a 'stepping stone' to forthcoming mandatory standards.'

The latest on the development of the standards themselves is covered in *Development of sustainability standards*, page 64 of this report.

Table 2.14: Obligated fuel supplier membership of standards bodies

Fossil Fuel Supplier	Sustainability standard				
	RSB[a]	RTRS	RSPO	BSI	ISCC
BP[b]	✓	✓	✓	✓	
Chevron					
ConocoPhillips					
Esso					
Greenergy	✓	✓	✓	✓	
Harvest			✓		
INEOS					✓
Lissan					
Mabanaft					
Morgan Stanley					✓
Murco					
Petroplus					
Prax					
Shell[c]	✓	✓	✓	✓	✓
Topaz					
Total					

a The International Petroleum Industry Environmental Conservation Association (IPIECA), who represent the oil industry more widely, is a member of RSB.

b BP Biofuels is a member of RSB & BSI, BP International is a member of RTRS & RSPO.

c Shell International participates in all these these sustainability standards rather than the obligated supplier Shell UK.

Focus on palm

Palm oil is one of the most efficient biodiesel feedstocks in terms of the land area required compared to other oilseeds. It is also a perennial feedstock and requires relatively lower levels of nitrogen fertiliser input than, for example, rapeseed. These points combined mean that sustainable palm can offer very good GHG savings (the RED specifies a 'typical' saving of 62% where mills have pond effluent methane capture). However, due to significant levels of deforestation in areas where palm is grown, there is a higher risk of sourcing unsustainable palm compared to other feedstocks, and it suffers from poor public perception. It is therefore particularly important that suppliers who choose to use palm take care where it is sourced from.

Table 2.15: Obligated supplier use of certified palm

Supplier	Proportion of supplier's fuel derived from palm 08/09	Proportion of supplier's fuel derived from palm 09/10	Proportion of supplier's palm RSPO certified 08/09	Proportion of supplier's palm RSPO certified 09/10
BP	6%	6%	100%	29%
Chevron	10%	9%	0%	24%
Conoco Phillips	2%	9%	0%	84%
Esso	13%	13%	0%	12%
Greenergy	4%	1%	0%	100%
Harvest	2%	10%	0%	73%
INEOS	N/A	0%	N/A	N/A
Lissan	0%	0%	N/A	N/A
Mabanaft	14%	2%	0%	0%
Morgan Stanley	22%	8%	0%	0%
Murco	20%	0%[a]	0%	N/A
Petroplus	16%	11%	0%	0%
Prax	26%	0%[a]	0%	0%
Shell	0%	2.4%	0%	0%
Topaz		0%		
Total	19%	5%	0%	5%
Overall UK supply	10%	6%	0.5%	28%

a Following the verification process, 61% of Murco's feedstock and was reported as unknown with the remainder being oilseed rape. Before verification six percent had been reported as palm. This related to fuel supplied before 2009, after which it has stated that it has sourced only oilseed rape.
b All of Prax's sustainability information was downgraded to 'unknown' by the RFA as it failed to have its data verified. It had reported 65% of its feedstock as palm.

Compared to the first year of the obligation, the level of palm use has reduced significantly, from ten percent in Year One to six percent in Year Two, and in absolute terms from 127 million litres to 99 million litres. This appears to relate directly to suppliers changing their procurement practices

in response to sustainability concerns. Many suppliers have also taken action to source RSPO certified feedstock where they have used palm. Table 2.15 illustrates which suppliers sourced palm and their efforts in sustainable sourcing.

Preparing for RED

Many of the reports provide clear evidence that suppliers are seeking to integrate C&S into their business processes, including contracts. For example, Shell states that:

'We require suppliers to work with Shell to develop a more sustainable supply chain. We review their progress on a regular basis and reserve the right to conduct independent audits and to terminate contracts.'

Such activities appear often to be prompted by the forthcoming RED requirements. Others note that the RED means that UK suppliers are no longer the only ones seeking C&S information through their supply chains and that this has contributed to more upstream suppliers being able to provide information. This is borne out with better reporting on criteria that are critical for RED compliance, such as being able to demonstrate that the type of land the feedstock was grown on did not have high carbon or biodiversity value: 'unknown reporting' for land use was down from 42% in Year One to 29% in Year Two.

Conclusion

Evidence from supplier reports indicates that, although not all suppliers are meeting the indicative C&S targets, overall, the RTFO reporting scheme has provided a useful function.

The data to enable measurement of the performance of the RTFO has improved significantly from the first year, reflecting suppliers' efforts to establish chains of custody. More significantly perhaps, it appears also to have provided a useful stimulus to improve actual C&S performance. Looking at palm supply alone, it is difficult not to conclude that public reporting has played a role in encouraging the majority of suppliers to source more carefully, with most suppliers using both less palm overall and more to sustainable standards.

The combination of better data provision and C&S performance also indicate that the RTFO reporting system has played a useful role in providing a 'stepping stone' to forthcoming mandatory standards.

However, the significant variation in performance between individual suppliers, and the continuing relatively low level of performance against the targets overall confirm the message from last year that voluntary reporting alone is unlikely to secure sustainability. The forthcoming implementation of the RED should provide a minimum standard to avoid the worst biofuels, whilst the reporting requirements could continue to play a role in promoting best practice.

Section 3

Effects of the RTFO and the fuels supplied

Effects of the RTFO on greenhouse gas emissions

Carbon savings delivered by the RTFO

The main aim of the RTFO is to deliver carbon savings in the road transport sector. The savings achieved by different biofuel feedstocks are determined using a life cycle analysis methodology that measures carbon emissions along the fuel chain from cultivation of the biofuel feedstock to entry of the biofuel to the UK. It includes greenhouse gas emissions from processing and transport as well as from direct land-use change[1], though indirect emissions are not accounted for.

All of the greenhouse gas emissions (including nitrous oxide, methane and carbon dioxide (CO_2)) are converted to equivalent units of CO_2 (CO_2e) so that useful comparisons between fuel chains can be made. For example, one unit of nitrous oxide emitted to the atmosphere is equivalent to 296 units of CO_2.

In the second year of the RTFO, net CO_2e savings of 2.0 million tonnes[2] were achieved through replacing 3.3% of fossil road transport fuel with biofuels. This is equivalent to taking 1.7% of cars off the road or the populations of Cardiff, Edinburgh and Belfast not using their cars for a year.

Over the first two years of the RTFO, 3.6 million tonnes of carbon have been saved, which is consistent with the Department for Transport's anticipated carbon savings for the RTFO[3].

Where did the carbon savings come from?

The average savings delivered by the biofuels supplied to the UK in Year Two was 51% – an increase from the 46% delivered in Year One. This is in line with the Government's Regulatory Impact Assessment estimation of 50% saving by 2010.

Carbon savings of different biofuels can vary widely depending on the feedstock, the country of origin, how the feedstock was cultivated, the biofuel processing method, and transportation distances and modes. During the course of Year Two the source of biofuels supplied to the UK has diversified such that biofuels came from at least 17 different feedstocks from at least 31 countries, compared to at least 12 feedstocks and 18 countries in Year One. For example, the number of countries from which both UCO and tallow are sourced has more than doubled. The main sources of biofuel, however, have remained consistent across the two years. The biggest shifts from Year One to Year Two were a large increase in Argentinean soy and a corresponding drop in US soy; a 1.7-fold increase in Brazilian sugarcane; and the doubling of volume of biofuel from France (including oilseed rape, wheat, corn, sugar beet, tallow and UCO). The most significant new feedstock is wheat.

There were two biofuel feedstocks supplied which typically deliver increased carbon emissions relative to the fossil fuel they replaced. These were oilseed rape from USA and Spanish barley which increased emissions by eight percent and 25% relative to diesel and petrol, respectively. These made up just 0.6% of the total biofuel.

Figure 3.1: Proportion of biofuel by feedstock

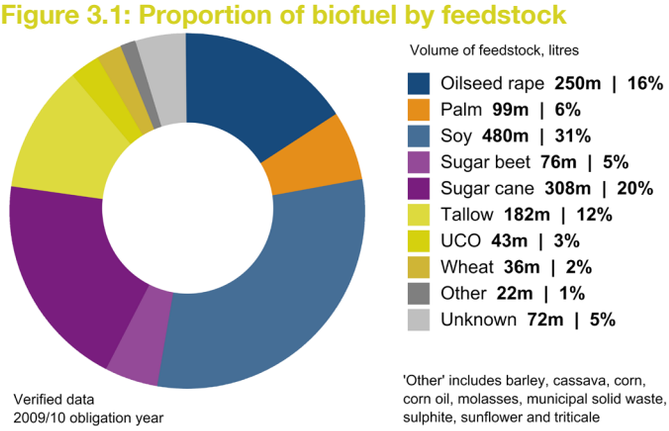
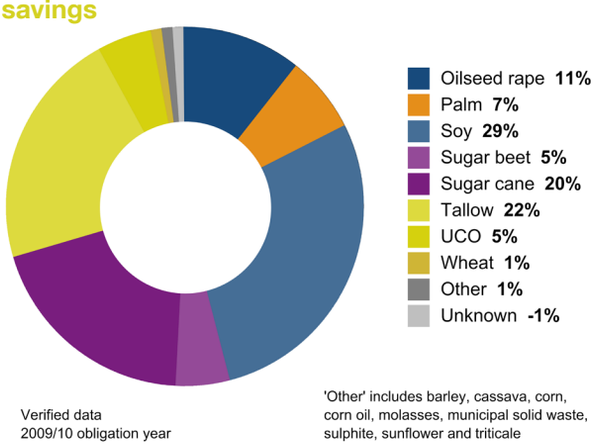


Figure 3.2: Contribution of feedstocks to carbon savings



1 Direct land-use change is included where it is reported. However, for 2009/10 suppliers are allowed to report 'unknown' for previous land use. This amounted to 29% of all fuels in Year Two.

2 2.0 million tonnes of CO_2e is equivalent to 0.54 million tonnes of carbon.

3 DfT estimated savings of approximately 2.6 to 3.0 million tonnes of CO_2e per annum by 2010 based on a 5% biofuel volume target (or ~2.5 billion litres of biofuels). This is equivalent to 0.7 to 0.8 million tonnes of carbon. Note that RTFO volume targets have since been revised downwards following the advice of the Gallagher Review and other evidence of the indirect effects of biofuels.

Some feedstocks made greater contributions to the overall carbon savings delivered under the RTFO than others, depending on both the volume supplied and the savings of that biofuel feedstock relative to others (Figure. 3.1 and 3.2). UCO, for example, made up three percent of the total biofuel volume but delivered five percent of the total carbon savings due to its relatively good carbon performance. Conversely oilseed rape comprised 16% by volume but contributed only 11% of the overall carbon savings.

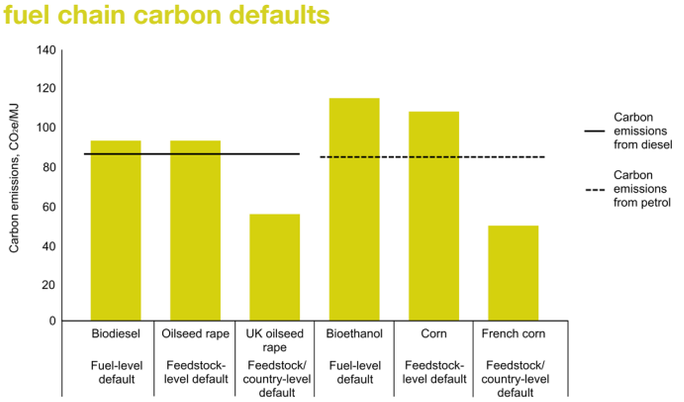
Accuracy of the carbon saving results

The RFA's approach to setting fuel chain carbon defaults

The RFA has calculated carbon defaults for almost 400 fuel chains over the first two years of the RTFO. The RFA defaults are set conservatively to encourage the supply of data. Thus fuel-level defaults (unknown feedstock and country) are more conservative than feedstock-level defaults (known feedstock, unknown country), and feedstock-level defaults are more conservative than feedstock/country-level defaults (known feedstock and country) (Figure. 3.3). The feedstock/country-level defaults are included in the RFA's Carbon Calculator so that suppliers can perform their own GHG calculations by editing all or part of the fuel chain with their own data.

Within the RFA fuel chains there are default carbon emissions assigned to each step which take into account all of the energy inputs and outputs. Some of these defaults are based on typical emissions for that step in the biofuel chain, whilst others are set more conservatively. The overall effect is that the feedstock/country-level defaults are generally more conservative than fuel chains calculated using actual data. The overall intention is to provide an incentive for suppliers to report actual data and ultimately to adopt more carbon efficient production methods.

Figure 3.3: Illustration of the RFA's approach to setting fuel chain carbon defaults



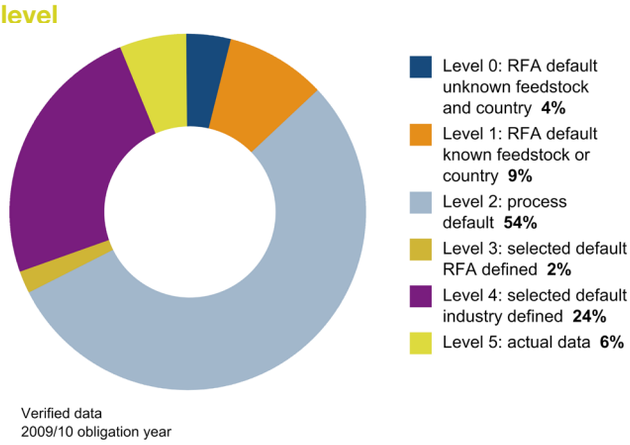
Accuracy Level of the carbon data

The 'Accuracy Level' reported by suppliers reflects the type of data used to determine the carbon emission. Overall there has been little change on this measure from Year One, with the majority (68%) of data supplied on biofuel carbon emissions relying on the RFA's carbon defaults (Accuracy Levels 0 to 2) – see Figure. 3.4. A quarter of the data was calculated by replacing RFA defaults within the fuel chains with industry data. The carbon emissions of a small proportion of the biofuels (six percent) were determined using actual data for all or part of the fuel chain (Accuracy Level 5) – this represents a 50% increase from Year One.

Most of the feedstocks reported using actual data (Accuracy Level 5) delivered better savings than the RFA fuel chain defaults (Table 3.1). In general editing the RFA defaults with the fuel chain or using industry data did not significantly alter the carbon savings compared to the RFA defaults. However, for some feedstocks the savings increased substantially; namely, Danish oilseed rape, US soy and UK sugar beet. In the case of Danish oilseed rape the RFA default was based on the 'unknown' country default due to the small volumes of biofuel, so is likely to have been very conservative and therefore not representative of the actual GHG savings.

The use of actual data to improve reported carbon savings, and actions to reduce process and agricultural emissions could be further encouraged by a scheme that rewards carbon savings.

Figure 3.3: Proportion of biofuel at each accuracy level



Verified data
2009/10 obligation year

Potential carbon emissions from unknown feedstocks, countries and previous land-use

A number of suppliers were unable to determine the feedstock or country from which some of their biofuel was sourced: five percent of the feedstock and 14% of the country of origin was reported as unknown (compared to one percent and 19%, respectively, in Year One). To determine the potential carbon savings delivered by these 'unknowns' an analysis was undertaken to determine the carbon savings of the RTFO under 'typical case', 'best case' and 'worst case' scenarios. The analysis did not assume any land-use change, either direct or indirect.

The best and worst case scenarios assume that biofuel sourced from an 'unknown' feedstock or country was actually from the feedstock or country which delivered the highest or lowest carbon savings, respectively. The 'unknown' countries were allocated to the best/worst country within that feedstock, whilst the 'unknown' feedstocks were allocated to the best/worst feedstock/country combination for that fuel type. These were based on the 'best' or 'worst' feedstock/country combination reported under the RTFO.

The typical case scenario distributed the biofuels from 'unknown' countries to the known countries for that feedstock, whilst the 'unknown' feedstocks were distributed across the known feedstocks, in proportion to the known data.

In the worst case scenario the carbon savings are similar to those actually used in this report. This is because the RFA set carbon defaults for unknown feedstocks and countries conservatively (Table 3.2). The typical and best case scenarios would deliver an additional six and nine percent carbon saving, respectively. Therefore, it is likely that had the feedstock and country of origin been determined for all of the biofuels supplied under the RTFO the reported carbon savings would have been higher.

The previous land use, however, was not determined for 29% of the biofuels supplied to the UK. There was no reported change in the previous land use, i.e. there was no reported conversion of grassland or forestland to cropland. Nonetheless, if some of this 'unknown' previous land use was carbon stock rich grassland or forestland, it would significantly reduce the carbon savings of the RTFO or result in a net release of carbon relative to fossil road transport fuels.

Table 3.1: Feedstocks reported with Accuracy Level 3 to 5

Fuel Type	Feedstock	Country	Accuracy level			RFA Default GHG Saving
			3	4	5	
Biodiesel	Oilseed rape	Denmark		69%	69%	-8%
		France	47%		50%	34%
		Germany	44%			44%
		United Kingdom			39%	36%
	Palm	Indonesia		46%		46%
		Malaysia	46%	44%	61%	46%
	Soy	Argentina	44%		59%	44%
		Uinted States		53%		33%
	Tallow	Germany	82%	84%		84%
		United Kingdom		85%	85%	85%
		United States		80%		80%
	Used cooking oil	Germany	85%			84%
		Ireland		85%		85%
		United Kingdom	80%	85%	85%	85%
Ethanol	Corn	France		46%	46%	42%
	Molasses	Guatemala	-4%			53%
	Sugar beet	France	41%			41%
		United Kingdom		81%	82%	41%
	Sugar cane	Brazil	71%	71%	81%	71%
	Wheat	France	23%			23%
Biogas	Municipal solid waste	United Kingdom			69%	58%
Total			40%	68%	69%	

Carbon savings better than RFA default
No difference
Worse than RFA default

Feedstock-level default as no specific feedstock/country-level default due to small volumes

Table 3.2: Potential carbon savings of biofuels delivered under the RTFO based on scenarios for the source of biofuels from unknown feedstocks and/or countries

	CO_2 saved (millions of tonnes)	Change from reported carbon savings
Reported carbon savings	1.97	Not applicable
'Best case' carbon savings	2.31	9%
'Typical case' carbon savings	2.21	6%
'Worst case' carbon savings	1.96	0%

Carbon savings under the Renewable Energy Directive

The RED has its own life cycle analysis (LCA) methodology with carbon defaults for a number of different feedstocks which are listed in the Directive. Although broadly similar, there are some important differences between the RED and Year Two RTFO methodologies which are listed in Table 3.4. These account for differences in the fuel chain carbon defaults for a number of feedstocks, most of which are within a few percent though for some, including key feedstocks such as palm and soy, there are larger differences (Table 3.3).

The total carbon saving of fuels delivered under the RTFO in Year Two is similar under both methodologies: 1.99 under the RED and 1.97 million tonnes CO_2e using RTFO methodology[4]. Note, however, that the feedstock was not determined for 5% of the total biofuel, so this fuel would not be eligible under the RED. In addition, the default carbon saving of two key feedstocks – soy and palm – would not meet the mandatory 35% GHG saving required under the RED (Table 3.3). Together with the other feedstocks that achieve less than a 35% GHG saving (barley[5], molasses[5], triticale[5] and wheat) these feedstocks make up 40% of the biofuel supplied under Year Two of the RTFO.

In order for suppliers to use these feedstocks under the RED they will need to demonstrate 35% or greater GHG savings. This could be achieved through the use of actual data for all or part of the fuel chain; from sourcing feedstock grown on degraded land (for a 29 gCO_2e/MJ GHG 'bonus'); or, for palm, sourcing from biofuel process plants that include methane capture.

In addition, for all feedstocks, suppliers will need to be able to identify the previous land use under the RED. Whilst there has been an improvement in data supplied on land use from Year One – there is still a gap of 37% unknown previous land use for biodiesel and 11% for bioethanol (compared to 43% and 36%, respectively, in Year One).

Table 3.3: RED versus RTFO carbon savings for feedstocks reported under the first year of the RTFO

Fuel Type	Feedstock	Proportion of total biofuel	Carbon saving	
			RED	RTFO
Biodiesel	Corn oil [a]	0%	74%	79%
	Oilseed rape	16%	38%	31%
	Palm	6%	19%	46%
	Soy	31%	31%	42%
	Sunflower	0.2%	51%	22%
	Tallow	12%	83%	82%
	UCO	3%	83%	85%
	Unknown	1%	n/a	-7%
Bioethanol	Barley [a]	0%	7%	-25%
	Cassava [b]	0%	36%	-36%
	Corn	1%	49%	42%
	Molasses [a]	0%	27%	33%
	Sugar beet	5%	52%	75%
	Sugar cane	20%	71%	71%
	Sulphite [a]	0%	90%	93%
	Triticale [a b]	0%	26%	-36%
	Wheat	2%	16%	24%
	Unknown	1%	n/a	-36%
Biogas	MSW	0%	73%	69%

Feedstocks that do not meet the RED 35% GHG saving threshold

a RFA calculation of carbon savings according to RED LCA methodology. Note that the 'RED' carbon savings of these feedstocks are indicative only – these may be superseded by carbon defaults published by the Commission.

b Note that no carbon default was determined for these feedstocks in Year Two as they were supplied in very small quantities. The carbon emissions are therefore based on the conservative fuel-level carbon default, and may not represent actual carbon emissions.

Towards the Renewable Energy Directive

For Year Three of the RTFO, the RFA has converted all of its carbon defaults to be in line with the RED LCA methodology.

4 In order to determine the carbon savings if the same biofuels were delivered under the RED the reported carbon emissions for each feedstock were replaced with the 'conservative' RED defaults (where available) or with RTFO Year Three defaults calculated using the RED LCA methodology (where no RED default was available).

5 Note that the 'RED' carbon savings of these feedstocks are indicative only – these have been calculated by the RFA using the RED LCA methodology and may be superseded by carbon defaults published by the Commission.

‘The previous land-use was not determined for 29% of the biofuels supplied to the UK’

Figure 3.4: Main differences between the RTFO and RED LCA methodology accounting for differences in feedstock carbon defaults

LCA component	RTFO Year Two LCA methodology	RED LCA methodology
Fuel chain	Takes into account biofuel feedstock plus country of origin.	Takes into account biofuel feedstock, and in some cases, the biofuel production process type.
Approach to setting carbon defaults ‘conservatively’	Carbon defaults for unknown country are set based on the ‘worst’ country for that feedstock, and for unknown feedstocks are set based on the ‘worst’ feedstock/country combination for that fuel type to encourage the supply of data. For ‘known’ feedstock/countries carbon emissions are based on typical or common worst practice to encourage the supply of actual data.	‘Typical’ emissions are determined based on a full LCA assessment then a conservative factor of 40% is added to the biofuel processing stage. This is the ‘default’ carbon emissions that economic operators must report in the absence of actual data. ‘Unknown’ feedstocks are not permitted. Additionally, to determine the previous land-use the exact location of where the crop was grown will need to be known (including the country of origin and NUTS[b] region within the country for EU feedstocks).
Land-use change	Includes emissions from land converted from grassland or forestland. No carbon penalty for ‘unknown’ previous land-use. Indirect land-use change not included.	Includes emissions from land converted from grassland. Conversion of land with high carbon stock not permitted. ‘Unknowns’ not permitted. Indirect land-use change not currently included.
Co-products[a]	Treated, where possible, through the ‘system expansion’ method. Emissions include any increased, or avoided, due to an increased supply of a co-product. Where data is unavailable, ‘allocation by market value’ is used, which allocates a proportion of the emissions to the co-product in proportion to its relative value.	Accounted for using the ‘allocation by energy content’ method (exceptions for some wastes and residues) – carbon emissions are allocated to the biofuel and co-products in proportion to their energy content. Excess electricity from co-generation allocated by (a restricted) system expansion method.
Emission factors, conversion factors and input values.	These differ between the two methodologies, but are generally comparable.	

a Examples include animal feeds, electricity and chemical products

b Nomenclature of territorial units for statistics, level-2: http://ec.europa.eu/eurostat/ramon/nuts/home_regions_en.html

For feedstocks that are included in the RED we have replicated the GHG calculation for the fuel chain, and for other feedstocks not yet included, we have recalculated the carbon emissions using the RED LCA methodology. So that suppliers can edit these fuel chains to perform their own calculations they have also been included in the RFA’s Carbon Calculator. The RFA is also working with BioGrace[6] – an EU wide project to harmonise emission factors and conversion factors (or standard values) used in GHG calculations across Member States – by sharing data and cross-checking results to ensure consistency.

Converting the RFA carbon defaults to be consistent with the RED is helping suppliers prepare for RED implementation by identifying whether their biofuel feedstocks meet the minimum 35% GHG saving requirement. Where feedstocks do not automatically meet this threshold, suppliers will need to source alternative feedstocks, or source feedstocks that have demonstrably reduced emissions along the fuel chain, for example, through improved agriculture practice or a more efficient biofuel production process.

6 www.biograce.net

Effects of the RTFO in the UK

Impacts of the RTFO on UK business

UK businesses form a key group of stakeholders in the RTFO. By definition, the obligated companies operate in the UK – many are part of large international corporations, others are fully UK based. There are UK biofuel producers, some large and more small, there are UK farmers supplying feedstock for processing in the UK and abroad. In between are the commodity traders, support industries and other interested parties. This chapter seeks to assess the impacts of the RTFO on each of these groups. Much of the data comes from a study carried out for the RFA between September and November 2010 which included an extensive consultation with relevant stakeholders to determine the impacts of the policy on their business. The full report of this study can be found on the RFA website[1].

UK market costs

The study found that there was strong correlation between fatty acid methyl ester (FAME) biodiesel and fossil diesel prices. This is supported by information from Argus Media which confirms that biodiesel is traded at a price related to fossil diesel. Before excise duty, FAME biodiesel traded at a price above fossil diesel throughout the period. However, the cost of supplying FAME to the market was typically lower than for fossil diesel during the 2009/10 obligation period due to a 20p/litre lower rate of excise duty on biodiesel. Only for the first two months of the 2009/10 obligation period did the FAME price exceed the diesel price when excise duty costs are taken into account. Assuming that FAME and diesel sell for the same price (a fair assumption since they are blended and sold without labelling), there has been approximately £39 million in revenue available to the blenders selling FAME.

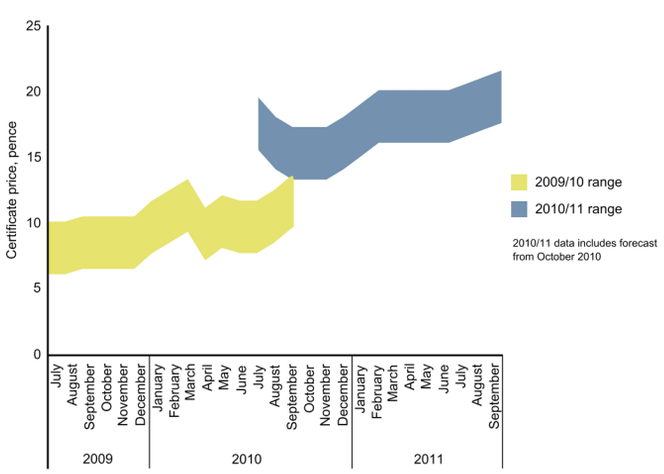
The situation with bioethanol is not as clear-cut as the ethanol price is not directly linked to the petrol (gasoline) price. However, throughout Year Two, the duty differential has more than accounted for the additional cost of bioethanol over gasoline, resulting in approximately £87 million of revenue for the blenders.

The market for RTFCs has operated successfully throughout Year Two, with evidence from published auction prices and those involved in trading certificates that 2009/10 certificates have traded for between six and 12p per certificate throughout the year. Market demand for certificates has improved in Year Two. Only 0.1% of Year Two certificates remained in the RTFO accounts of biofuel-only suppliers after the Year Two redemption deadline, compared to 67% of certificates at the corresponding date in Year One. Early evidence from Year Three is that 2010/11 certificates are trading in the range of 15 to 20p.

Compared to price levels for the previous year, both feed wheat and oilseeds were trading at lower prices than in 2008/09. Prices for both of these commodities are driven by global supply and demand. During Year Two there was no clear link between their prices and those for biodiesel and bioethanol during Year Two. There was, however, a closer correlation between bioethanol and sugar prices in Europe and bioethanol and maize prices in the USA.

For used cooking oil, the market is very clearly driven by the biodiesel industry. There was a surge in demand for UCO in 2008 which resulted in a price increase from around £250 per tonne to over £550 per tonne. There was a reduction in demand due to lack of profitability for the UCO biodiesel industry during 2009, with prices falling back to around £350 per tonne. From April 2010, when the duty differential was removed for most biofuels, it was retained for biodiesel from UCO. This resulted in prices in late 2010 reportedly reaching towards the highs of 2008.

Figure 3.4: Certificate values



Costs and benefits to obligated suppliers

When asked about the impacts of the RTFO on their expenses, revenues and profits, over half of the obligated suppliers who commented reported no effect. In each category, one respondent reported a very positive effect, and in the case of profits, one respondent reported a very negative effect. Although there was approximately £130 million revenue available to blenders, as this is a relatively insignificant sum relative to the revenues of many of the obligated companies,

1 www.renewablefuelsagency.gov.uk/yeartwo

it is unsurprising that the overall impact is reported by most suppliers as minimal.

In terms of costs involved in administrating the RTFO, obligated companies reported employing between half and one full time person, with a few tens of thousands of pounds required each year for third party verification.

Nearly all obligated parties report no current value associated with carbon and sustainability provenance of biofuels in Year Two. However, nearly all anticipate higher values for assured provenance once mandatory sustainability standards are in place. A premium value of $20 per tonne of biofuel has been indicated as the value of RED assured C&S. However, there are currently no trades at this level as sellers and buyers await decisions by member states on the implementation of the RED.

Costs and benefits to UK biofuel producers

UK biofuel producers are positive about the ability of the UK market to supply biofuels certified as sustainable. This applies both to those companies producing from by-products such as tallow, used cooking oil and municipal solid waste as well as those using crops such as sugar beet, oilseed rape and wheat which can all be assured to the ACCS standard. However, under the current reporting system, the ability of obligated suppliers to buy un-certified biofuels on the spot market means that demand for certified feedstocks and longer-term supply contracts is more limited than it might be. UK producers consider this to be an important reason for difficulty in securing investment: new UK plants generally need debt finance to build them, and this typically requires long-term off-take contracts.

Domestic biofuels producers also expressed concern that they faced a more challenging market environment than other domestic markets in the EU and beyond. For example, respondents noted that the UK applies a lower tariff on ethanol imported from outside the EU than other EU countries, making it harder for the UK industry to compete with imports than it is for European neighbours. It should be noted that UK consumers benefit from this approach however, in that the UK has access to cheaper biofuels produced outside the EU. There is also some evidence of supply contracts for non-EU biofuels. For example, 61% of fuel meeting the Meta-Standard was imported from Brazil – a direct result of supply contracts and independent audits.

State and prospects for UK agriculture

The contribution of UK crops to UK supplied biofuels grew marginally from five percent in Year One to six percent for Year Two.

The farmers selected for interview were located in the regions most likely to supply the UK's largest biofuel production facilities directly. The study found that there is fairly low awareness and understanding of the RTFO amongst this group. There is concern however, that compliance with sustainability requirements for biofuel feedstocks may lead to a reduction in revenues and profits. UK farmers believe that their crops are sustainable and that they can demonstrate this so long as there is value available to them to cover the costs of any additional administration required.

The majority of farmers report that there is currently no price premium for certified sustainable feedstock, however a fifth of those interviewed reported 'a little' premium and a further fifth that there was 'enough'. In contrast to obligated parties and biofuel producers, farmers reported that they expected the current lack of price premium for certified sustainable feedstock to persist in the coming years, and that they will have to meet any costs of administration related to demonstrating compliance with the requirements.

The majority of UK farmers interviewed for this project saw their ability to access the UK biofuel feedstock market as poor, commenting on lower cost imported feedstocks with little or no known sustainability provenance. Farmers felt that this was unfortunate since any increased profit or revenue for UK biofuels with assured sustainability could help to pay for the investment required to continue to increase yields, thus reducing the incremental land area required to supply the market.

Farmers tended to anticipate altered production in response to a growing biofuels market. Changes were most likely in crop varieties and quality, and in particular specific changes to the carbohydrate levels of grain to improve ethanol yields.

In general, farmers are less aware of the role of the RFA than people in organisations closer to the fuel supply end of the market. Farmers tend to look to their industry associations such as the NFU and the HGCA for information.

Conclusion

The main themes and conclusions of this year's assessment of RTFO impacts on UK business in Year Two are familiar ones and consistent with the first year of the obligation. In particular:

- fuel blenders have continued to take advantage of available excise duty incentives to supply biofuels at a net profit;
- biofuel feedstocks with good C&S provenance data generally command no premium, though there are market expectations that this will change when the Renewable Energy Directive is implemented;
- the UK biofuel supply sector report the UK to be a particularly challenging market in which to secure investment due to a range of issues, including the application of trade tariffs, the 'voluntary' nature of the RTFO's C&S reporting requirements and policy uncertainty.

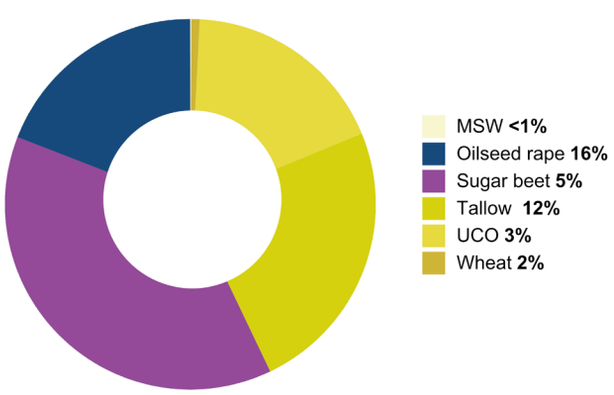
However, a notable development between Years One and Two has been the trade of RTFCs and the ability of non obligated parties, including the small-scale suppliers to extract value from certificates. The growth in RTFC trading, including the development of a role for RTFC traders provides a supportive indicator that this critical aspect of the RTFO is working well after a difficult start in Year One. This is particularly important given the removal of the excise duty incentive for most biofuels from April 2010, which has effectively placed an onus on RTFCs for the market to operate effectively.

Land usage for biofuels from UK feedstocks

Some of the most prominent concerns about sustainability of today's biofuels stem from their use of agricultural land. New demand for biofuels sits alongside growing demand for food and animal feed as well as other forms of bioenergy. If these combined needs cannot be met by land in current production, new land will be required presenting a risk that natural areas with high biodiversity values or carbon stocks will be converted.

During 2009/10, 11% of the biofuel supplied in the UK came from UK feedstocks; this is a slight increase from Year One (9%). Of the UK feedstock, 58% was from crops (oilseed rape, sugar beet and wheat) and the remainder from by-products (tallow, used cooking oil and municipal solid waste) – see Figure 3.5. The proportion of the UK feedstocks derived from crops as opposed to by-products is similar to Year One (62%).

Figure 3.5: Proportion of UK feedstock by volume



Verified data
2009/10 obligation year

Analysis has been undertaken to estimate the land areas used for the biofuels reported under the RTFO. These have been derived from the volume of fuel and the standard yield/conversion factor figures as published in the RFA's Technical Guidance for Year Two. Note that only UK crops subsequently supplied as biofuel in the UK are included here. Results of the analysis are included in Table 3.5.

The land area used for biofuels has been calculated in two ways: a 'gross' area, estimating the entire area required to grow the crop; and a 'net' area, which allocates the land requirements between the biofuel and relevant co-products as listed in the RFA's Technical Guidance. Co-products that are not related to crop cultivation have been excluded from the analysis, for example lime from sugar beet processing.

Table 3.5: UK feedstock land usage

Feedstock (UK)	Oilseed rape	Sugar beet	Wheat
Adjusted[a] volume of biofuel supplied in UK, million litres	41	61	1
Estimated land area to supply biofuel, hectares	29,700	11,800	340
Estimated[b] percentage of country's crop by land area	5.1%	8.4%	0.0%
Estimated net land area to supply biofuel, hectares	12,800	5,240	159
Land efficiency, litres of biofuel per hectare (net)	107	263	130

a Note that these values differ to those presented in other parts of this report as they have been adjusted to include 'unknown' country and feedstock data. 'Unknowns' have been distributed across the 'knowns' in proportion to the known volumes. **b** Based on FAO crop area figures for 2009 harvest.

In the Year Two GHG calculation methodology, a system expansion method is used to allocate greenhouse gas emissions between the biofuel and the biofuel's co-product. In order to compare the efficiency of land usage, for each feedstock and country, the energy content of the fuel has been divided by the net land area, giving an efficiency value in gigajoules[1] per hectare.

It is estimated that the gross area of land was used in the UK for biofuels supplied in the UK during 2009/10 was 41,800 ha. This is an increase of approximately 25% from Year One.

Sugar beet

Sugar beet was the UK feedstock with the largest reported volume of fuel in 2009/10. The estimated 65 million litres of bioethanol from sugar beet equates to a gross area of 11,800 ha of land and eight percent of the UK sugar beet crop. Sugar beet pulp, which is used as an animal feed, is a co-product of the sugar beet cultivation process. When this co-product is accounted for in the calculations, the land area assigned to ethanol reduced to 5240 ha.

Sugar beet is the most land efficient crop reported under the RTFO in Year Two, producing 263 gigajoules of energy per hectare (GJ/ha).

1 One gigajoule is equal to one million joules.

More information on the cultivation of UK sugar beet is included in *Agricultural production models*, page 57.

Oilseed rape

Oilseed rape makes up an estimated 39% of biofuels from UK crop based feedstocks. The estimated 41 million litres supplied came from 29,700 ha of land and represented approximately five percent of the UK's oilseed rape crop. Oilseed rape also has an animal feed co-product which accounts for just over half of the land, meaning that a net area of 12,800 ha can be allocated to the production of the biodiesel.

In terms of the UK crops, oilseed rape has the lowest land efficiency at 107 GJ/ha. However, due to higher crop yields in the UK it has a higher land efficiency value than most countries.

Wheat

UK wheat ethanol was supplied for the first time in 2009/10, coming into the supply for the last few months of the obligation year. An estimated one million litres were supplied, coming from around 340 ha of land and accounting for less than 0.1% of the UK's wheat crop.

Land efficiency for wheat grown in the UK is 130 GJ/ha, comparing favourably against other wheat growing countries due to the UK's higher yields.

Conclusion

There has been growth in the volumes and land areas of UK feedstocks between Year One and Year Two; however, biofuels remained a minor end use for these feedstocks. New biofuel production capacity continues to come on line in the UK, and there are initial indications (*see Impacts of the RTFO on UK business and agriculture* page 44) that prices for feed wheat in the North East of England are starting to diverge from those in the rest of the country due to local sourcing of the feedstock for bioethanol production in that area.

Due to its relatively high crop yield figures, the UK performs well compared to other countries in terms of land usage efficiency. Information on how much land is used internationally for biofuels can be found in the next chapter.

International effects of the RTFO

Land usage for international feedstocks

During 2009/10, 76% of the biofuel supplied in the UK came from international feedstock[1]. Of this, 89% was from crops including oilseed rape, palm, soy, sugar cane and sunflower with the remainder from by-products including tallow, used cooking oil and molasses.

For each crop, the area farmed for UK biofuel in each country has been estimated using the yield figures from the RFA's C&S Technical Guidance Part 2 (version 2.1 for Year Two). These figures have been compared to the total area of this crop in each country as given by the Food and Agriculture Organisation of the United Nations.

Total gross land usage for biofuels supplied in the UK has increased slightly from 1.3 million hectares in Year One to 1.4 million hectares in Year Two.

In many cases, the crop output is shared between biofuel production and other products – called co-products. For example, when crushing soybeans, approximately 20% of their weight is extracted as oil which can be converted to biodiesel. The remaining 80% is soy meal which is used as a component of animal feed. In order to illustrate the share of the land used by the co-products, land area has been calculated in two ways: a 'gross' area, estimating the entire area required to grow the crop; and a 'net' area, which allocates the land requirements between the biofuel and the land based co-products as listed in the RFA's Technical Guidance. In order to compare the efficiency of land usage for each feedstock and country, the energy content of the biofuel has been divided by the net land area, giving a value in gigajoules per hectare.

Table 3.6 overleaf shows the biofuel volumes, estimated land areas and proportion of each country's crop for the biofuels reported to the RFA in 2009/10. Figures 3.6a,b,c overleaf show the volume of biofuels and land usage for the highest volume feedstock/country combinations. Figure 3.7, also overleaf, shows the land efficiency.

Soy

The feedstock with the largest estimated gross crop area is soy with just over one million hectares. Soy made up an estimated 38% of the fuel and 77% of the land used for UK biofuels – similar proportions to those reported in Year One.

In Year Two, an estimated 75% of soy came from Argentina. This represents nearly 830,000 ha of land, or five percent of the total Argentinean soy crop. When accounting for the soy meal co-product, the net land requirement in Argentina for biodiesel supplied to the UK was approximately 156,000 ha or just under one percent of the total Argentinean soy crop.

Soy produces approximately 81 gigajoules of biofuel energy per net hectare. This falls within the range of values for oilseed rape, but is somewhat lower than palm.

A case study examining Argentinean soy production and its environmental and social impacts can be found on page 52 of this report.

Oilseed rape

Oilseed rape required the second largest amount of land for UK supplied biofuels. At 201,000 ha, this was only one fifth of the land used for soy. Like soy, rape produces a valuable co-product in the form of rape meal. This reduces the net land requirement by more than half.

German rapeseed accounted for an estimated 50% of UK supplied oilseed rape biodiesel, equating to six percent of the country's crop. This was a significant reduction from Year One when eight percent of the German oilseed rape crop was used for UK biofuels. A case study on the impacts of German oilseed rape production can be found on page 54 of this report.

Due to large variations in yield between different countries, the land efficiency for oilseed rape varies significantly. In the Ukraine, which has the lowest yield, it is 39 GJ/ha, whilst in Germany, which has the highest yield of the countries shown, it is 121 GJ/ha. A higher yield is preferable in terms of land usage efficiency; however levels of inputs must also be taken into account as higher levels of inputs can translate to higher GHG emissions.

Palm oil

In 2009/10, an estimated eight percent of UK biofuel supplied from crops was reported to be derived from palm oil, all of which came from Malaysia and Indonesia. This required only two percent of the overall land required for biofuels supplied into the UK market. There was a reduction of 18% in both biofuel production volume and land used from Year One to Year Two.

Even when taking the co-products of oilseed rape and soy into account in the land use calculations, palm is the most land efficient of the biodiesel feedstocks, with the highest oil yield per hectare. The land efficiencies for Indonesian and Malaysian palm are 146 and 157 GJ/ha respectively.

1 A further 14% was of unknown origin.

Table 3.6: Estimated overseas land area used for UK biofuels

	Feed-stock	Country of origin[a]	Adjusted[b] volume of biofuel supplied in UK, million litres	Estimated land area to supply biofuel, hectares	Estimated percentage of country's crop by land area	Estimated net land area to supply biofuel, hectares	Land efficiency, GJ per hectare (net)
Biodiesel	Oilseed rape	France	48	32,900	2%	14,200	112
		Germany	133	84,400	6%	36,400	121
		Ukraine	11	20,500	2%	8,830	39
		UK	41	29,700	5%	12,800	107
		United States	11	15,800	5%	6,800	55
	Palm	Indonesia	32	10,600	<0.5%	7300	146
		Malaysia	73	22,400	1%	15,300	157
	Soy	Argentina	382	829,000	5%	156,000	81
		USA	124	262,000	1%	49,300	83
Bioethanol	Corn	France	14	3,870	<0.5%	1,970	146
	Sugar beet	France	13	2,370	1%	1,050	263
		UK	65	11,800	8%	5,240	263
	Sugar cane	Brazil	317	55,400	1%	55,400	122
	Wheat	Belgium	6	2,270	1%	1,060	117
		France	31	11,900	<0.5%	5,570	117

a A minimum volume of 5 million litres has been used for inclusion in this table.

b These values differ to those presented in other parts of this report as they have been adjusted to include 'unknown' country and feedstock data. 'Unknowns' have been distributed across the 'knowns' in proportion to the known volumes.

Sugar cane

Sugar cane contributed an estimated 71% of UK supplied bioethanol derived from crops. An estimated 55,400 hectares of land was required to cultivate sugar cane in Brazil, representing 0.6% of the Brazilian sugar cane crop. These numbers have increased from Year One, when an estimated 31,400 ha representing 0.4% of the Brazilian sugar cane crop was reported.

Brazilian sugar cane produces 122 GJ/ha, although it is not the highest efficiency bioethanol feedstock, it generally compares well with other feedstocks. In the RFA's greenhouse gas methodology, sugar cane does not have any co-products; therefore its gross and net figures for land usage are the same. Looking at the gross figures alone, sugar cane and sugar beet have a similar land use efficiency, however when the sugar beet pulp co-product is accounted for, the net land use efficiency for sugar beet is significantly higher.

Corn

Corn was a new feedstock for 2009/10. All of the corn was of European origin; an estimated 95% came from France, with small amounts from Spain and Hungary. A total of 4,060 ha was used to grow this, of which 3,870 ha was in France. It is one of the most efficient feedstocks, using relatively little land per unit of biofuel.

Sugar beet

Sugar beet was supplied from France as well as the UK in Year Two. An estimated 2,370 ha was used to supply this, approximately one percent of the French sugar beet crop. The area reduces to 1,050 ha when co-products are taken into account. Sugar beet has the highest land efficiency of all of the crop-based biofuel crops reported in Year Two. For both France and the UK, this is 263 GJ/ha which is approximately double the productivity of the next best performing feedstock.

Wheat

The majority of the wheat reported in Year Two came from France, occupying 11,900 ha and representing less than 0.5% of their total crop. There were also 2,270 ha of wheat grown in Belgium supplied as biofuel in the UK, which represents one percent of the Belgian wheat crop. Land efficiency for wheat grown in Belgium and France is 117 GJ/ha.

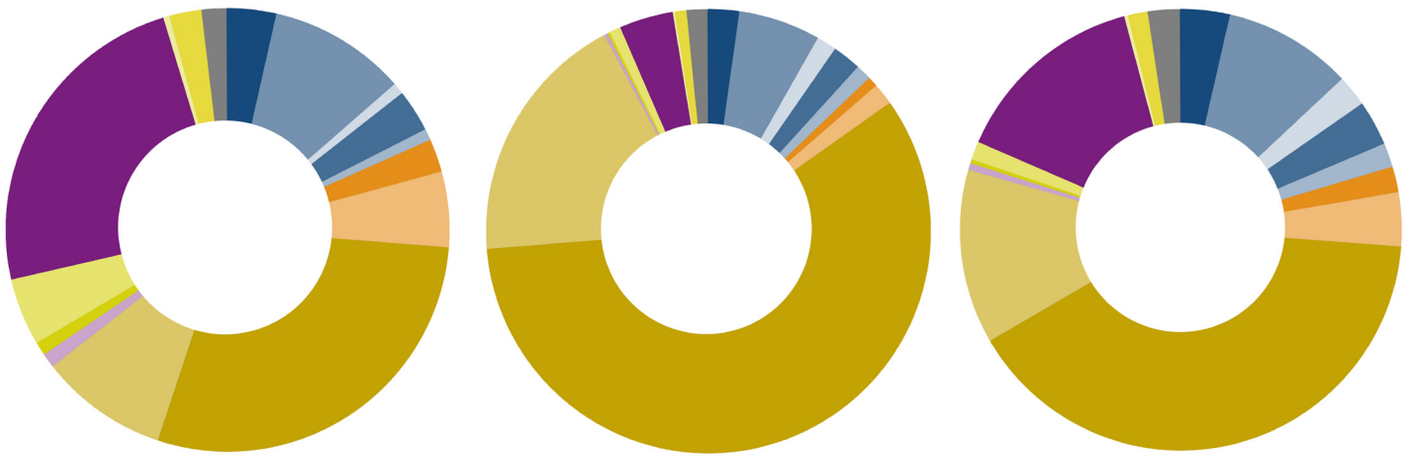
Conclusion

There was a 22% increase in biofuel volume supplied in the UK between Year One and Year Two. The increase in the gross land area to supply these biofuels was only nine percent. The increase in land area was smaller than the increase in biofuel volume since a larger proportion of the biofuel was made up from by-products in Year Two. The treatment of co-products has a large effect when considering land areas, with reductions of between zero and 81% of the gross area of the farmed crop depending on the feedstock. The analysis illustrates why it is so important to consider the relative productivity of biofuel feedstocks using a range of metrics. Land usage is a key issue in the biofuel arena as both direct and indirect land use change can significantly effect the GHG emissions of the fuel. Whilst there are new generations of biofuel technology which seek to reduce or eliminate the need to use agricultural land for biofuel production, there is still a significant land use implication from today's mix. Increases in land use efficiency are therefore a positive step, so long as overall GHG emissions are the same or reduced.

Figure 3.6a: Adjusted volume of UK biofuel sourced from international crop feedstocks

Figure 3.6b: Estimated gross area of overseas land used for UK biofuels

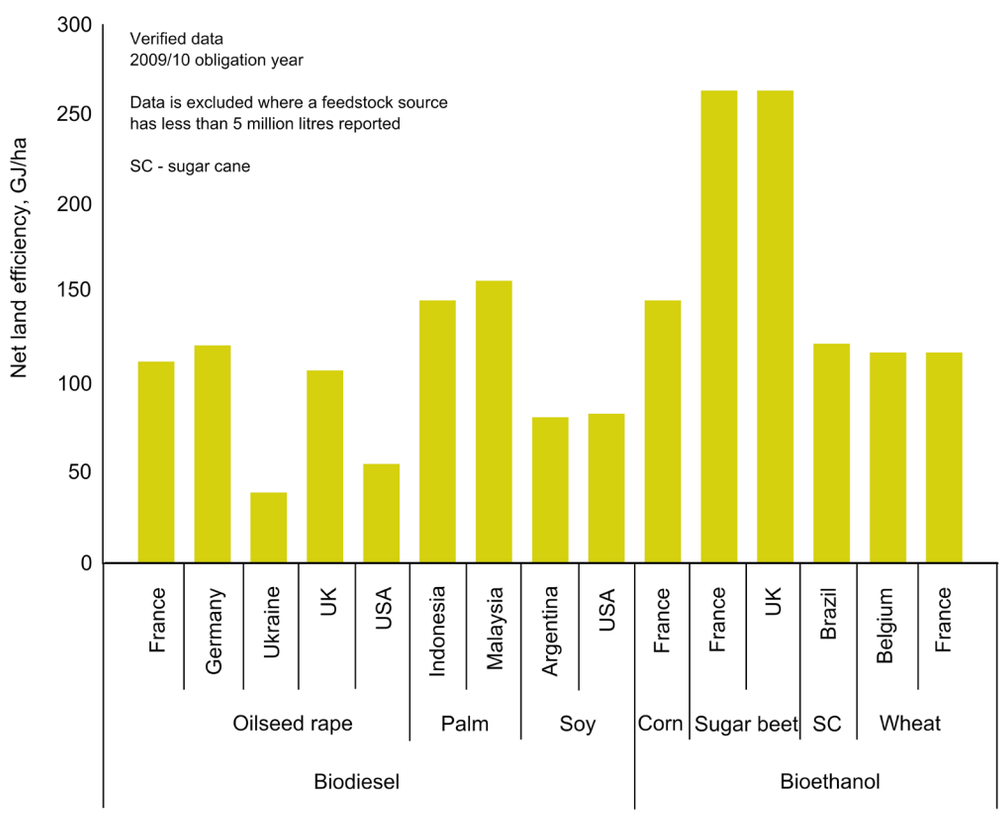
Figure 3.6c: Estimated net area of overseas land used for biofuels



Proportion of: biofuel volume | gross land area | net land area

- Oilseed rape France **4% | 2% | 4%**
- Oilseed rape Germany **10% | 6% | 9%**
- Oilseed rape Ukraine **1% | 1% | 2%**
- Oilseed rape UK **3% | 2% | 3%**
- Oilseed rape USA **1% | 1% | 2%**
- Palm Indonesia **2% | 1% | 2%**
- Palm Malaysia **5% | 2% | 4%**
- Soy Argentina **29% | 59% | 40%**
- Soy USA **9% | 18% | 13%**
- Corn France **1% | <0.5% | 1%**
- Sugar beet France **1% | <0.5% | <0.5%**
- Sugar beet UK **5% | 1% | 1%**
- Sugar cane Brazil **24% | 4% | 14%**
- Wheat Belgium **<0.5% | <0.5% | <0.5%**
- Wheat France **2% | 1% | 1%**
- Other **2% | 2% | 2%**

Figure 3.7: Land usage efficiency



Case study - Argentinean soy

In 2009/10, soy was the largest individual feedstock supplied under the RTFO with 480 million litres reported representing 30% of overall biofuels supplied. Of this, the vast majority was from Argentina, replacing the United States as the predominant origin of soy supplied to the UK biofuels market.

Insights on soy production and trade

Soy has become an increasingly important agricultural commodity with demand for soy protein meal and vegetable oil growing since the 1970s due to the rise in global purchasing power and increases in population. Along with the USA and Brazil, Argentina is one of the major producers of soy at around 21% of global production. Argentina is also the main global exporter of soybean meal and soybean oil, with exports for 2009/10 estimated at 24.7 and 4.4 million tonnes respectively. The soybean industry is currently recognised as the largest and most dynamic within the farming sector in Argentina and the main source of national export revenues.

Argentina has also been acquiring a strategic role in meeting a growing international demand for biofuels. Soybean oil has become the main feedstock for the production of biodiesel in Argentina. The capacity of the country to develop a robust biodiesel industry is mainly driven by favourable international market prices and the soy conglomerates. Despite its relatively recent entry to the biofuels market, Argentina is now the world's fifth largest biodiesel producer reaching 1.2 million tonnes in 2009, as well as the biggest exporter of biodiesel across the globe.

In 2009 Europe was the main market for Argentinean biodiesel with EU imports of 850,000 tonnes. Although nearly all biodiesel production in Argentina is for export purposes, the nation is expected to have a rapid growth of its domestic market due to the implementation of national legislation. Argentina is in the process of further developing a profitable and well-structured industry that has attracted investors' attention worldwide.

Soybean production in Argentina

Soybean covers 57% of all sown lands in Argentina, with production reaching 47.9 million tonnes per year. Argentina holds the highest average yield in Latin America at three tonnes per hectare. Soy production is found in 14 provinces of the country, though the larger part is concentrated in the Pampa. The wide adoption of genetically modified 'Round-up Ready' soybean along with no-till techniques has allowed the expansion of cultivation in almost all regions of the country. In Argentina, harvested areas of soybeans have increased from four million hectares in 1989, to 11 million in 2001 and 17 million in 2009. Detailed figures on the types

of land converted are not available, however, it is clear that some has displaced other crops, some has taken the place of the reducing numbers of cattle farmed on the Pampas and some conversion of forest has taken place. There are risks of increased carbon emissions due to direct and indirect effects.

The development of planting consortiums has produced large increases in the proportion of land being rented with 55% of the beans produced in Argentina by farmers who don't own the land. Besides fast growth in the average productivity of soy, the production costs of the crop in the country are the lowest in South America due to high rates of adoption for cutting-edge technology and the availability of fertile land.

Sustainability of soy production in Argentina

There is debate about environmental issues associated with the expansion of soy in Argentina including deforestation; displacement of part of the agricultural production of wheat, corn and sorghum; conversion of pastureland in the Pampas to soy production; low replacement of soil nutrients and reduced levels of crop rotation which ultimately have negative effects on biodiversity. Although producers that are using the no-till technique in Argentina account for more than 80% of cultivated land in the country, a much smaller proportion of producers use other good agricultural practices such as crop rotation.

Argentinean native forests have been deforested at a rate of 0.85% per year over the long term, mainly due to the demand for new farmland. Between 1998 and 2002, over 940,000 hectares were converted, with native habitats of high biodiversity such as the Dry Chaco (70%), Humid Chaco, the Atlantic Forest and the Yungas being the most affected. In November 2007, the Native Forests Law was adopted by the National Congress in Argentina following an active civil

society campaign. Although this has slowed deforestation in some provinces, due to difficulties in enforcement in remote areas, it has not put final limits on the activity, and environmental NGOs are sceptical about the long-term successful implementation of the law.

In parallel, the lifecycle analysis of carbon savings from the use of soy biodiesel is currently a contentious area. Excluding indirect effects, recent studies suggest a default carbon intensity that would correspond to a 56% saving or more (max 75%) for Argentinean soy biodiesel. The default value given in the RED for soybean biodiesel is 31% which is below the 35% minimum greenhouse gas saving threshold. Although deliberately conservative, the RED default value has been calculated assuming the typical pathway for soy is biodiesel production in Europe from Brazilian beans. It has therefore been argued that the RED default value is not representative of the Argentinean biodiesel production pathway. Under the RED, it is possible for suppliers to provide their own carbon intensity data rather than using default values enabling them to meet the minimum greenhouse gas saving threshold.

The Argentinean soy industry has also been criticised by the media and NGOs for social inequities, particularly with regards to land use rights, human exposure to agrochemicals and the trend away from small-and-medium size producers to large scale agribusiness. Although agriculture is an important economic sector in Argentina, accounting for 9.2% of the country's GDP and more than 50% of all national exports, it has been criticised for its minor contribution to job creation – only one employee is required per 200 ha. The soy industry has contested such views, arguing that they do not recognise the significant benefits for employment elsewhere in the supply chain.

There has been anecdotal evidence throughout the soy producing provinces of damage to neighbouring communities from widespread and indiscriminate use of agrochemicals, especially the herbicide glyphosate which is linked to the introduction of GM soy. Most frequently reported cases include the appearance of chronic illnesses due to long or constant exposure to low quantities of agrochemicals in populations who live close to the soybean fields. Despite the existence of health and safety legislation on agrochemicals, information in the media regarding these cases is quite significant and continues to be presented by social NGOs in Argentina.

Sustainability schemes for soy

The Roundtable on Responsible Soy (RTRS) and the Certified Agriculture programme from the Argentinean no-till farmers association (AAPRESID) are focal sustainability schemes currently in existence in Argentina. Stakeholders differ in their views with regards to the potential effects either scheme will have. Among social movements and NGOs in Argentina and internationally, the RTRS is seen as an attempt at 'greenwashing'. They object to the RTRS' acceptance of GM soy and point to the increased use of herbicides, and the social issues this can raise. Nevertheless, there seems to be an increasing willingness by farmers, at large and small scale and by other members of the soybean supply chain to comply with the sustainability criteria set up by the schemes. The RFA has benchmarked the RTRS scheme against the RTFO Meta-Standard and has found it to meet the Qualifying Standard for both environmental and social sustainability. This means that the RFA accepts RTRS certification as sustainability assurance.

Currently the size of the market for certified beans is still unclear, as is the premium the market is willing to pay for them. Farmers will be less sceptical towards enrolling in the certification process when a market for sustainable certified beans has been secured. However, the level of commitment by the soybean industry in Argentina to achieving sustainable practices is yet to be proved.

Conclusions

As the world's demand for food, vegetable oil, animal feed and fuel has continued to increase, Argentina has been able to respond and capture a significant share of many growing international markets. This was originally driven by the demand for soy meal for animal feed, with the oil being seen as a by-product finding a productive use. In parallel to its role serving the world markets, the soybean industry in Argentina has also been a major driver of economic development for the country.

The expansion of soy production in Argentina for usage in the food, animal feed and biodiesel industries has posed both threats and opportunities. Mitigation strategies are starting to be put in place in Argentina to address some of the sustainability issues, although there is some way to go before large-scale effects will be realised. Sustainability certification schemes such as the RTRS may play an important role in driving change and demonstrating that standards are being met. The soybean industry has the potential to achieve positive changes in the Argentina and the correct usage of the agricultural expertise developed in the industry could be an essential tool for achieving long-term sustainability.

The full study is available at www.renewablefuelsagency.gov.uk/yeartwo.

Case study – German oilseed rape

During Year Two of the RTFO, oilseed rape was the third most widely used feedstock after soy and palm, being responsible for 13% of the biofuel reported to the RFA. 41% of this was supplied from Germany, the largest contributor of rapeseed entering the UK biofuels market.

The rapeseed industry in Germany

The German rapeseed industry has been enduring a difficult period. A combination of factors has led to a period of consolidation within the industry, with many smaller companies either merging or filing for bankruptcy.

The economic downturn of the last few years led to a 3.2% reduction in demand for all fuels as economic activity decreased. The effect on diesel was less pronounced (0.4 reduction) than petrol due to incentive schemes for people to replace older cars, which accelerated the trend towards diesel vehicles. However, demand for pure biodiesel (B100) in Germany fell sharply due to the removal of the duty incentive on it.

The rapeseed growing industry in Germany

Putting to one side concerns about indirect effects (see discussion below), the agricultural production of rapeseed in Germany is a relatively uncontroversial subject, in comparison with soy or palm in other parts of the world for example. Rapeseed is grown in all regions of the country, and is primarily part of a three or four year rotation with cereal crops such as wheat and barley.

Rapeseed is a useful break-crop as part of arable rotation, helping to reduce the build-up of cereal specific pests in the soil. Traditionally break-crops have been grown mainly for this purpose, rather than for the economic yields that they give, and so a break-crop that also has financial incentives to be grown is welcomed by farmers. As a result, other break-crops such as lupins or field beans with little economic value have been replaced by rapeseed. This replacement of less economically attractive crops, along with the cessation of the set-aside scheme in Europe, has meant that an increase in the growing area of oilseed rape has not led to significant direct land-use change in Germany. This is reflected in the data reported to the RFA, which gives the only known previous land use of German rapeseed as being 'cropland' (85%), with the remainder being 'Unknown' (15%).

The RFA commissioned a report into agricultural production models of the major feedstocks in their countries of origin as part of its research programme, including rapeseed from Germany. A summary of this work can be found on page 57 of this report.

The German rapeseed processing industry

As a result of the economic downturn and removal of duty incentives, the industry is currently operating at around only 50% of production capacity.

This situation has been reflected in the imports of German rapeseed to the UK reported under the RTFO. There was a small reduction in the share of the market for German rapeseed from 45% down to 41% between Year One and Year Two of the RTFO; but the overall volume of rapeseed from Germany fell by 30% in this period due to the lower total quantity of rapeseed biodiesel reported. The German trade body UFOP would like to see an increase in the additive proportion of biofuel in German fossil fuels to try and re-stimulate the industry, although this may require changes to the fuel specification.

Trading patterns between the UK and Germany for the raw agricultural product, refined oil and rapeseed biodiesel are complex. Both countries produce rapeseed, and both are operating under-capacity in their respective biodiesel manufacturing industries. There is evidence to show that some rapeseed grown in the UK is exported to Germany for processing; and then imported back to the UK as biofuel; although this area needs further research to obtain definite figures.

Sustainability of German rapeseed

Work has been undertaken for the DfT looking at iLUC caused by different feedstocks. This study proposed that increased use of rapeseed for biofuels could cause a shortfall in oilseeds for the food industry which would ultimately be filled by higher demand for palm oil. Conversely, the study also proposed that increased production of rapeseed biodiesel, and in particular its co-product rape meal, could also increase the supply of animal feed. This could have the effect of decreasing demand for soy, which is currently an important source of animal feed where it is used as a protein supplement. In the scenarios explored, the study found that the net effect of these two opposing factors was an iLUC carbon emission of between approximately 15 and 35 gCO_2e/MJ.

Focussing on direct measured emissions using conventional lifecycle analysis, RFA default values determine that the greenhouse gas savings of rapeseed from Germany are 44%, which is above the RFA feedstock level default of 38% for this feedstock. This can largely be attributed to the lower nitrogen fertiliser inputs applied by German farmers in comparison to rapeseed grown in other parts of the world.

There are concerns about the local effects of growing rapeseed on allergy sufferers. However, current understanding is that it is being blamed unfairly for pollen causing allergies which is actually from birch and grasses; perhaps in part due to it's very visible yellow presence in fields and strong smell.

Sustainability standards

Two standards were operational in Germany during Year Two relevant to rapeseed production: Fediol and Qualitat und Sicherheit. In Year Two of the RTFO, 68% of oilseed rape biodiesel from Germany met one of these standards. However, both are aimed at food safety issues rather than sustainability, and thus neither scores well against the RTFO Meta-Standard.

Four per cent of German rapeseed was reported as meeting the full RTFO Meta-Standard. In these cases production of the feedstock was independently audited directly against the Meta-Standard. With the coming Renewable Energy Directive, two standards have been devised in Germany in preparation for the minimum sustainability requirements.

'REDcert' has been in operation since February 2010, and as the name suggests has been aimed squarely at compliance with the RED criteria for sustainability. It is therefore considerably more limited in scope than existing sustainability standards such as the RTFO Meta-Standard,

with no coverage of the environmental effects of crops on air, soil or water, and no social criteria.

The other standard to emerge is the International Sustainability and Carbon Certification (ISCC) standard, which is based in Germany but designed to be applicable internationally. This standard goes further than the RED minimum criteria, for example it meets the social criteria of the RTFO Meta-Standard. However, at present the standard does not meet the full auditing requirements of the Meta-Standard.

Conclusions

With the exception of the unresolved issue of indirect effects, German rapeseed does not face major sustainability issues in its production. The green house gas saving of German oilseed rape is amongst the better performers for that feedstock; and there is no evidence to show that direct land-use change is being caused by its cultivation.

The industry has suffered during the recession, and is operating well below capacity leading to some interesting trade patterns of imports and exports between other European countries. The removal of financial incentives to buy B100 fuel has affected the industry the most, and producers would like to see an increase in the blending ratio in fossil diesel to increase their market even though this may require changes to fuel specifications. Sustainability standards for German oilseed rape have been largely absent in the industry until recently, but the introduction of two new standards aimed at RED compliance will change this.

The full study is available at www.renewablefuelsagency.gov.uk/yeartwo.

Section 4

Towards sustainable biofuels

Agricultural production models

In the first two years of operation, the RTFO reporting system has identified which feedstocks are being used for biofuels supplied into the UK, and the countries from which they have been sourced. To help identify the sustainability effects of this supply, and to identify opportunities for improvement, the RFA commissioned ProForest to review the nine most used sources. The review focussed on the type of agricultural models used (i.e. size and structure of the operation) and methods (e.g. inputs and equipment) typically employed.

Table 4.1: Combinations of feedstocks and countries assessed in the study

Feedstocks	Country
Oilseed rape	Germany, France, UK
Soy	Argentina, United States
Palm	Malaysia, Indonesia
Sugar beet	United Kingdom
Sugar cane	Brazil

Production models

In general, for the crop and country scenarios examined, production is taking place on large farms, with a lower proportion of small farmers or smallholders.

The annual arable crops examined tend to be grown across a range of farm sizes, whereas the plantation crops (oil palm and sugar cane) are more polarised between large-scale plantations and smallholders.

In Europe, there has been a trend towards consolidation and therefore larger farm areas over the past century. For oilseed rape, this trend is most obvious in Germany, followed by the UK. While this trend also exists in France, the farms growing oilseed rape are smaller than in either Germany or the UK. The research indicates that oilseed rape is planted on larger holdings than sugar beet; however it is important to note that both of these crops are grown in rotation and may be part of a larger farm holding.

The crops examined in North and South America, soy and sugar cane, were farmed on much larger holdings than the European crops. This is likely to be due to a combination of factors including access to land, historic farming patterns and crop type.

In Southeast Asia, the only crop examined was oil palm, which is generally grown on a much larger scale than annual arable crops. Data indicates that around 40% of plantations are 'small' i.e. less than 50 hectares. In practice, large scale plantations are likely to be tens of thousands of hectares in size.

Production models are linked to factors such as ownership, economics, structure and employment. Smaller farms are important for rural livelihoods and they can generate more local employment than larger farms. They can also have an important role in assuring equity in rural income generation. However, due to economies of scale smaller operations are almost always less profitable and thus less competitive than larger farms. This is usually due to higher production costs resulting from lower yields, reduced access to farming technology and higher labour requirements.

Table 4.2: An overview of production methods assessed by the study

Production Methods	
Crop rotation	The practice of planting a succession of crops in a field over a period of years.
Tillage	The preparation of soil by ploughing, ripping, or turning it. Used to prepare the soil, remedy compaction, incorporate fertilizers and herbicides, influence water movement and control weeds.
Conventional tillage	The use of primary and secondary tillage with maximal soil disturbance and removal of almost all crop plant residues.
Conservation tillage	A variety of tillage systems that leave a minimum of 30% of crop residue on the soil surface.
No till	The strictest form of conservation tillage, where no tillage is carried out in order to minimize soil disturbance.
Precision agriculture	Varying input and cultivation techniques to match varying soil and crop conditions in the field, and increase efficiency of cultivation. This achieved through use of technology and in-field monitoring.
Transgenic varieties	Crop varieties that have been genetically modified for yield improvement, insect resistance or herbicide tolerance.
Cover crops	Crops that are planted primarily to provide ground cover, reduce erosion and improve soil properties, rather than provide a harvestable yield.
Targeted pesticide application	Spraying the only area around the plant (palm tree) with pesticide(s) and not the area between the plants.

Production Methods

Crop rotation

Oilseed rape and sugar beet are almost always planted in crop rotation. Crop rotation is also very common in US soy cultivation.

The benefits of crop rotation include increases in yield, profitability, residue cover, soil fertility and a reduction in erosion. This contributes to mitigation of pest, disease and weed cycles, decreasing agrochemical inputs and runoff. There can also be benefits for other crops in the rotation: for example, nitrogen fixing by soy may improve nitrogen availability for a following crop such as corn. Some crops, such as oilseed rape, are used as break crops for cereals.

Tillage

Conventional tillage is the most common system for oilseed rape in the UK, Germany and France, sugar beet from the UK and sugarcane from Brazil.

In reduced tillage approaches, more plant residue is left on the soil surface and soil disturbance is decreased.

This study found that reduced tillage, conservation tillage and no-till are most commonly used in soy cultivation in the US and Argentina, where the majority of the cultivation is carried out using one of these systems. Their prevalence is linked to the use of transgenic soy that facilitates weed control without tillage.

Benefits of reduced/conservation tillage include reductions in labour requirements, fuel cost, erosion, nutrient leaching and off-site sedimentation, and increases in soil organic matter and biological activity. In the absence of transgenic varieties, the drawbacks may include difficulty in weed control, reduced yield and increased requirements for agrochemicals.

Precision agriculture

Precision agriculture is commonly used in US soy production and in a small proportion of oilseed rape, sugar beet and Argentinean soy production.

Benefits include increased yields, reduced (or more efficient/effective) agrochemical use and reduced soil and water contamination. Agriculture is often associated with nitrate leaching into water tables, and therefore targeted nitrogen application could reduce this significantly. However, precision agriculture can also be expensive (depending on which technologies are used) and access may not be readily available for farmers in many areas.

Transgenic and conventional varieties

The *Roundup Ready* transgenic soy variety, is widely used in soy cultivation in the US and Argentina. This variety has been genetically modified to be resistant to glyphosate, the active ingredient in the herbicide *Roundup*. This means that weed control can be carried out whilst the crop is growing.

The main benefits of transgenic soy are the reduction in production costs resulting from lower costs of weed control and reduced labour requirements. Transgenic soy has also enabled wider use of conservation and no-till systems that have environmental benefits. The drawbacks include the impacts of glyphosate on the environment and human health. There has also been an increase in glyphosate resistant weeds, leading to increases in usage of other herbicides.

Mechanised harvesting

Arable crops including soy, oilseed rape and sugar beet are all harvested mechanically. Oil palm is harvested manually. Both methods are currently prevalent for Brazilian sugar cane. More than half is harvested mechanically in the Centre-South (and the proportion is increasing rapidly), while only ten to 30% of the harvest is mechanised in the Northeast.

Manual sugar cane harvesting is associated with burning of the cane prior to harvest in order to facilitate the manual cutting. Negative impacts of the burning may include soil erosion, atmospheric emissions, and damage to surrounding infrastructure and vegetation. Social drawbacks can include poor labour conditions and low salaries for the migrant labour hired for the harvest, and respiratory illnesses associated with burning. Mechanical harvesting has significantly lower labour requirements, which can increase the profitability of the production. However, there are concerns about increases in rural unemployment.

Cover crops

In oil palm, the use of leguminous cover crops between crop rows is common. In soy cultivation in the US and Argentina, cover crops may be used between crop harvests, but they are associated with increased production costs which limit their use.

The benefits of cover crops include increases in water infiltration, soil organic matter, soil fertility, and decreased erosion, nutrient leaching and run-off into waterways. They can also help the suppression of weeds, pests and diseases and reduce herbicide and pesticide inputs.

Pesticide application in oil palm

Targeted pesticide application as opposed to blanket spraying is estimated to be used in approximately 30 to 40% of Malaysian plantations and 20 to 30% of Indonesian plantations.This technique reduces labour requirements as well as pesticide use, and enables the use of cover crops and the environmental benefits associated with these. Reduction in remuneration for herbicide applicators may be a negative social impact.

Greenhouse gas savings

Analysis of the possible effects of varying agricultural production models on the total GHG emissions for a biofuel was undertaken using the RFA's Carbon Calculator. The default values used were those in the RFA's Technical Guidance part 2 version 3.1, in operation for 2010/11. In this version, RED default values are used where available with existing RFA default values where no RED value existed.

This analysis indicated that varying the agricultural methods is likely to have an impact on inputs such as fertiliser and pesticide as well as on yields and therefore on GHG savings. Individual examples have been found where a fuel chain's actual GHG emissions are up to 23% lower than the default carbon intensity under the RED. This is being achieved by practices currently in use. However, underlying factors such as regional differences related to climate and geographic factors such as soil may have a more significant impact, even within countries.

Opportunities to reduce inputs through precision farming, use of nitrogen fixing-cover crops, crop rotations, conservation tillage and organic farming may improve GHG savings, provided the yield is maximised in proportion to the inputs, and there is economic incentive to do so.

Incentives for reporting actual values or seeking to define new default production pathways under the RED are likely to exist only where the default value does not meet the minimum GHG savings[1]:

- For soybean biodiesel, where the EU default GHG saving is 31%, no-till farming can provide increased GHG savings. Widespread use of this method also means a more robust case can be put together for that specific production model. If no-till cultivation is combined with precision agriculture, data shows that the contribution of cultivation to the GHG emissions can be reduced from the default value of 373 $kgCO_2e/t$ to 219 $kgCO_2e/t$. This is a 41% reduction, representing a 14% decrease in the CO_2 emissions for the overall fuel chain.

- For palm oil produced without methane capture, where the default GHG saving is 19%, large-scale plantations without smallholders (particularly in Malaysia) may achieve greater GHG savings. New agricultural methods could also be developed to increase GHG savings, if there was a significant enough market to warrant it. For example, the Ophir smallholder project in Indonesia consistently outperforms larger commercial plantations in terms of yields whilst using significantly less Nitrogen fertilizer. At the high end of the Ophir project's yield range, the cultivation contribution to the total GHG calculation is reduced from the default of 128 $kgCO_2e/t$ to 74 $kgCO_2e/t$, a 43% reduction, representing a 14% reduction in the overall fuel chain. In a standard fuel production process, this represents a nine percent reduction in GHG emission. For a process including POME capture at the processing plant, this would represent a 23% reduction in the overall emissions.

Sustainability certification

Certification standards can help drive best practice methods and production. For example, the Roundtable on Sustainable Palm Oil (RSPO) standard has resulted in the increased use of targeted pesticide application and leguminous cover crops in palm oil cultivation. Provided the RTFO reporting requirements continue to have an effect on the sourcing policies of obligated companies, it is likely that the methods used for the feedstocks used in the UK will shift towards the better practices required by certification schemes. However, future developments in this area will be influenced heavily by how the RED is implemented and how the market and suppliers respond to it.

1 The FQD seeks to reduce overall carbon emissions from transport fuels and therefore may change this situation once implemented. UK implementation of the FQD is anticipated to be in the second half of 2011.

Working with other EU member states

The Renewable Energy Directive sets out sustainability requirements that all biofuels used to count towards the binding ten percent target will have to meet. The requirements are pioneering: no Member State or other country in the world has legislated for biofuels in such a way before. The implementation of the Directive therefore sets a new challenge, both for regulators and for the suppliers of biofuels required to meet the target.

The RED sustainability criteria and some of the rules governing their application such as the 'chain of custody' are set out at some length in the overarching legislation. Perhaps inevitably, however, considerable room is left for interpretation on certain aspects, allowing for the possibility of different rules in each member state. Given the global nature and complex trading patterns of the biofuels market, such a prospect will not be welcome to market participants. The Renewable Fuels Regulators Club (REFUREC) was initiated by the RFA precisely to help address consistent implementation and regulation of the nascent market. By facilitating and fostering stronger working relations between counterparts working in the field throughout Europe, REFUREC aims to minimise the regulatory burden of the new rules, and to maximise the RED's overall effectiveness.

REFUREC meets on a quarterly basis to share knowledge, ideas and strategies on how best to implement workable interpretations of the RED across our respective borders. The member states of the EU and the European Free Trade Association (EFTA) have, of course, evolved different methods of regulating biofuel consumption. Our different starting points, combined with the intrinsic subtleties and complexities of the legislation are what lead us to believe that this kind of close co-operation is key to successful implementation of the RED.

The inaugural meeting was held on 4 February 2010 in London, and was attended by representatives from the UK, Denmark, France, Germany, Hungary, the Netherlands, Portugal, the Republic of Ireland, the Slovak Republic, Spain, Sweden and the European Commission. Further events have been held in Brussels, Bonn and Madrid with plans for another in spring 2011. Most encouragingly, membership has grown to include representatives of the vast majority of those Member States tied to the RED.

One of the issues which REFUREC has focussed on is the definition of wastes and residues - the feedstocks which will be 'double counted' towards the RED and awarded with twice the number of tradable certificates in schemes such as the RTFO. The RED itself provides no definition for these terms, and although the EC's *Communication on practical implementation* published in June 2010 provides more detail, regulators will need to develop and communicate clear rules and processes for determining which feedstocks will be double counted.

The REFUREC concept is now maturing into a successful working-group of biofuel sustainability regulators, and a model of European co-operation. We continue to work towards the goal of an internationally sustainable biofuels industry, and view REFUREC as being one of the tools we require to make this a reality.

Further information on REFUREC can be found online at http://www.refurec.org

Figure 4.1: Other countries attending Refurec events

Food and fuel

In Year Two of the RTFO at least 80% of the biofuel used in the UK came from feedstocks that could potentially have been used for food or feed. There has been debate for some time over whether agricultural food products should be diverted to provide energy when people in parts of the world are suffering from hunger. Others argue that demand for agricultural products is created by the market and an increase in demand (e.g. through increased use for biofuel) will stimulate increased supply.

How increased supply is achieved is not without its own controversy. A recent IEEP report concluded that a land area larger than Belgium (4.1 to 6.9 million hectares) will be needed to replace food production displaced by biofuels produced for the EU market by 2020. However, estimates for land area required are complex. For example, biofuel production creates co-products that can be used for animal feed which can lead to reductions in land demand for animal feed crops elsewhere. Such complexity has led to controversy over what the estimates of additional land requirements are, nevertheless, any net additional demand for agricultural land will have environmental impacts which have the potential to be significant.

There are alternatives to this indirect land-use change: improving productivity on existing parcels of land already or formerly in production for food and feed is one option outlined in *ILUC update*, page 62.

The case for biofuels diverting food from the hungry is not supported by recent research for the Forum for Agricultural Research in Africa which highlighted the potential in Africa for biofuels to lead to enhanced food production with the right investment in land, infrastructure and human resource. Six case studies are presented covering six countries in east, west and southern Africa which illustrate the capacity for significant expansion of bioenergy production (including sugar cane, sorghum and palm) whilst providing income for farmers without displacing food crops.

However, food availability for the world's poor is not solely, or even primarily, related to adequate global production, but to the cost of food: the price spike of 2007/08 is estimated to have increased the number of people worldwide with insufficient food from 800 million to 1.02 billion, despite there being enough food to feed the hungry globally. The cause of the price spike has been a matter of debate. One report by the World Bank attributed up to two-thirds of the increased food cost was due to biofuels alone; however, more recent analysis by the same institution concluded that many factors were to blame and that the contribution of biofuels was much smaller than originally estimated.

The Gallagher Review, along with many other reports, noted additional factors to the spike including rises in oil prices, the effects of a weak dollar, intense speculations against commodity prices, export restrictions in some countries, and poor harvests in some areas in preceding years. However, modelling work undertaken by the Review showed that in the medium term biofuels would put an upward pressure on some commodity prices, resulting in small increases in poverty levels. It found that this would outweigh any positive economic benefits for some farmers.

The debate around how biofuels affect food prices and food security continues. In the near-term, the counterbalancing effects of co-products used for animal feed, remains a source of complexity and uncertainty in the analysis. Looking further ahead, advanced biofuels are cited as a potential solution as these can avoid competition with food, though the commercial timescales for these technologies remains uncertain.

The double counting of wastes and residues towards national energy targets within the EU under the RED was intended to help stimulate investment in advanced technologies that have the capacity to convert a wider range of feedstocks. Some current 'wastes' can already be converted using current technologies, and consequently the effect of this provision is likely to increase the proportion of non-food crop feedstocks in the biofuel mix. However, given the increase in overall biofuel volumes required to meet the ten percent target in 2020, it is clear that more agricultural production will be required. Making better use of existing agricultural land should be part of the solution in producing enough food and fuel without damaging carbon stocks or biodiversity.

The issues around food and fuel are clearly complex and global conclusions may not apply on a regional or country wide basis. There remains a need for this to be monitored as demand for biofuels and biomass across EU and elsewhere increases.

iLUC update

Biofuels rose to prominence at the very outset of the RTFO at the start of 2008. Articles in scientific journals pointed to the potential effects of global agricultural expansion that could result from growing demands for food, feed and biofuel. These indicated that the net greenhouse gas savings that biofuels actually offered was much less than had been previously understood, as new land, often rich in carbon stores, would need to be converted to agriculture. The new research led many in the NGO community in particular to call for a moratorium on biofuels policies, whilst the agricultural and biofuels sectors questioned the conclusions of the research and modelling.

Governments and policy makers in the EU and elsewhere reacted to the new evidence. In California, an 'iLUC factor' was introduced using economic models alongside conventional lifecycle analysis to discriminate between different biofuel feedstocks on the basis of forecast net carbon savings. In the EU, a requirement was included in the Renewable Energy Directive for the European Commission (EC) to review the impacts of indirect land-use change and ways to minimise that impact by December 2010.

Latest evidence

Since the RFA's Gallagher review was published in 2008, research on iLUC has continued apace. As well as numerous independent studies published over the period, the Commission issued several studies to inform their consultation. The results of most, if not all, work published over the period, including the studies published by the Commission, show the additional GHG emissions caused by iLUC can be significant. Agreement on a precise number remains necessarily difficult because of the very nature of the analysis. Nevertheless, whilst uncertainty remains, directionally the models tend to consistency. For example the comparison of economic equilibrium models conducted by the Joint Research Centre for the Commission's Directorate-General for Climate Action illustrate that they all estimate indirect emissions from biofuels to be at least in the same range as the direct emissions which are currently accounted for.

Aside from the economic equilibrium models considered by the Commission, the UK commissioned work by E4-Tech to develop an alternative, more transparent 'cause and effect' model. This alternative approach modelled market relationships using a combination of historical trends, and input and validation on future markets by an expert advisory group and stakeholder feedback. The net results of this work were broadly consistent with the equilibrium models in demonstrating potentially significant iLUC effects. However,

directionally, a notable exception was for EU wheat ethanol where in all scenarios modelled by E4-Tech it had a negative iLUC effect (i.e. there were 'positive' indirect effects). This was mainly due to a credit assuming that the dried distiller's grains with solubles (DDGS) by-product would be used as animal feed, substituting for soy-meal and thus reducing land pressures elsewhere. Treatment of such effects remains a source of inconsistency and uncertainty in the models.

Assessing the overall iLUC effect of the RED depends in part not only on the model used, but the underlying assumptions about the overall volume and type of biofuels that will be used to meet the 10% target. The International Food Policy Research Institute (IFPRI) study for the EC's Directorate-General for Trade (which anticipated an overall GHG emissions saving) took as its central scenario a 5.6% contribution from current biofuels to meet the overall ten percent target (the remainder being advanced biofuels and electricity). It assumed a split of 45% ethanol and 55% biodiesel. Recent analysis of Member States' plans to meet the Directive indicate both a greater proportion of conventional biofuels and a much higher proportion of biodiesel will be used to meet the target. Overall, this implies a greater iLUC effect.

One benefit of the E4-Tech approach is that it has helped to identify and model the type of mitigation actions that can be used to mitigate iLUC risk. This includes, but is not limited to:

- ensuring co-products from biofuel production are used as a replacement of land based products;
- use of new low carbon stock areas for production;
- integration of livestock and crop production systems.

These latter two options have been developed into a methodology termed Responsible Cultivation Areas, developed by Ecofys for the RFA, International Union for Conservation of Nature (IUCN), WWF and Shell. It provides

one clear way forward where biofuels can demonstrably avoid unwanted iLUC effects.

Renewable Energy Directive consultation

In July 2010, the EC launched its public consultation on how to address iLUC in the RED. It asked for views on whether the evidence on iLUC provided a good basis to assess its significance, whether action should be taken, and if so what. The document posed four possible courses:

A. No action, monitor.
B. Encourage greater use of some categories of fuel.
C. Discourage the use of some categories of fuel.
D. Take some other form of action.

The EC received over one hundred responses from a wide range of stakeholders including citizens, companies, trade organisations, Member States and other countries. Of EU Member States who responded, Table 4.3 below provides an indication of views recorded.

Table 4.3: Overview of Member State responses to EC consultation on ILUC

Country	Should action be taken?	Action type	Member State comments
Austria	No	A	Focus on RED implementation
France	Unclear	Unclear	Waste/residues should be encouraged
Netherlands	Yes	B and C	ILUC factor + sub-target for low risk ILUC fuels
Norway[a]	Yes	B and C	ILUC factor + bonuses for low risk ILUC fuels
Romania	No[b]	None	There is sufficient internal capacity in Romania to meet the target
Spain	No	None	
Sweden	Yes	D	ILUC should be included, but requires further methodological development
Switzerland[a]	Yes	B	ILUC factor. More work required to reduce uncertainty
UK	Yes	Not specified	Called on EC on to work with MSs to develop proposals. ILUC factor plus incentives a possible option

a Norway and Switzerland are not members of the EU, but as European countries part of the European Economic Area Agreement their views have been included here.
b Implicit in Romania's consultation response.

The UK response echoed many of the conclusions of the RFA's Gallagher review from 2008. It considered that the evidence base was 'compelling in showing that the greenhouse gas (GHG) emissions from iLUC are significant compared to the potential emissions savings from biofuel use'. Whilst the response acknowledged ongoing uncertainty in the modelling, it considered that 'uncertainty about the precise size of the impacts of iLUC should … not result in inaction'.

Although the UK did not recommend any particular policy solution, it indicated that "*the inclusion of both an 'ILUC factor' in the calculation of GHG emissions and GHG 'credits' for actions that practices that reduce ILUC risk without causing other significant impacts*" might be a way forward. It called on the Commission to engage with Member States to develop proposals that should be subject to a full impact assessment.

The responses from industry and other stakeholder views were similarly mixed to those of Member States. These ranged from those emphasising current uncertainty and arguing for no action (e.g. European Biodiesel Board, BP,) to support for bonuses for mitigation measures (e.g. Shell); to iLUC factors (e.g. Exxon, WWF).

Conclusion

Despite the growing weight of evidence that iLUC is an important issue that needs addressing, the issue remains deeply controversial. The ongoing lack of consensus amongst stakeholders and decision makers on the scale and nature of the effect has arguably held back the focus required to develop effective policy solutions. One consequence of this has been ongoing uncertainty in the future of the sector as a whole, creating a particularly challenging climate for investment in the UK and elsewhere. The EC's review provides an important opportunity to chart a clear way forward.

Development of sustainability standards

Social and environmental standards are at the heart of the RFA's efforts to encourage more sustainable biofuels.

The RTFO requires suppliers to report on whether their biofuels come from sustainable sources. Compliance with one of these standards is the main mechanism for demonstrating sustainability.

A limited number of the standards are well-established schemes set up to meet broader agricultural goals and adapted to cover the demands of the biofuels sector. Others are entirely new, created specifically to meet the requirements of the growing demands for sustainable biofuels.

Before a standard is accepted as 'qualifying' under the RTFO, both the criteria covered, and the auditing procedures required by the standard, are assessed against the RTFO 'Meta-Standard' and audit norm. The Meta-Standard has a series of seven principles as illustrated in the table below. Each principle encompasses a series of specific, measurable criteria.

Suppliers are also able to audit their crops directly against the Meta-Standard itself.

Table 4.4: RTFO Meta Standard principles

Environmental principles
1. Biomass production will not destroy or damage large above or below ground carbon stocks
2. Biomass production will not lead to the destruction of or damage to high biodiversity areas
3. Biomass production does not lead to soil degradation
4. Biomass production does not lead to the contamination or depletion of water sources
5. Biomass production does not lead to air pollution
Social principles
1. Biomass production does not adversely affect workers' rights and working relationships
2. Biomass production does not adversely affect existing land rights or community relations

Qualifying standards

Several existing standards only address either environmental issues or social issues. Therefore the Qualifying Standard is defined separately for environmental and social criteria.

If an existing standard sufficiently addresses both environmental and social criteria it can be both an Environmental Qualifying Standard and a Social Qualifying Standard.

When the RTFO was created, there was some concern that suitable standards did not exist to cover all feedstocks in all locations. As the scheme has matured, there has been real progress, with a growing number of schemes developing that, when operational, will ensure that there are applicable standards for most feedstocks in most regions. As more come online, so those gaps in coverage continue to shrink.

We continue to benchmark new assurance schemes against the RTFO Meta-Standard as they are developed. In this reporting cycle, we have benchmarked the following standards:

- BSI - Version 2 (November 2009)
- RTRS - Field Testing Version (November 2009)
- RSPO - October 2007 version (November 2009)
- Sustainable Agriculture Network/Rainforest Alliance (April 2009 and Addendum versions May 2009)

We have also seen wider take up of companies producing feedstock using the RTFO Meta-Standard itself for sustainability assurance. Greenergy and Shell have reported ethanol from Brazilian sugar cane being produced under the Meta-Standard, while Shell has also been working with some of its German suppliers of biodiesel from oilseed rape to ensure it is Meta-Standard compliant.

More recently, since the end of the annual cycle covered in the rest of this report, we have benchmarked:

- BSI – Production Standard (July 2010)
- ISCC – v1.16 (July 2010)
- RSB – Standard for EU market access (June 2010)

Benchmarking of the latest version of the RTRS standard is expected to be completed in January 2011.

The RFA has sought to engage with those who deliver the standards and with suppliers themselves. Our Chief Executive has met with a number of suppliers to discuss how they might improve the sustainability requirements of their standards to meet the RTFO Meta-Standard. The RFA has also worked with the standards bodies where appropriate to inform development and share best practice.

We have also benchmarked standards against known RED criteria with the intention of providing suppliers with up to date information. This aims to highlight possible gaps that may

Table 4.5: Overview of feedstock sustainability standards

	Status	Sustainability criteria						
		RED biodiversity[a]	RED carbon stock[a]	RED Amendments	Submitted to EC	RTFO Environmental	RTFO Social	iLUC
2BSvs	Operational	Not assessed	Not assessed	Based on RED criteria	Unknown	Not assessed	Not assessed	No
	French scheme designed from outset for RED compliance. Built around French market but applicable elsewhere.							
BSI[b]	Under development	Not assessed	Not assessed	Yes	Yes	No	Qualifying Standard	No
	Australia, Brazil, Dominican Republic, India; sugar cane. Benchmarking against the Meta-Standard shows strong overall performance but does not meet Environmental Qualifying Standard level due to non-compliance on Air Quality (burning) and no longer meets Social Meta-Standard level due to introduction of two-tiered criteria, meaning not all are mandatory.							
FSC	Operational	No	No	Unknown	Unknown	Qualifying Standard	No	No
	All regions; wood, wood fibres. Principly a timber standard, with stated intention of expanding certification of biofuels.							
Genesis QA[c]	Operational	Yes	No	Planned	No - see below	Qualifying Standard	No	No
	UK; oilseed rape, sugar beet, wheat. Has equivalence of outcome with RTFA. Plans to insert criteria on land use for RED compliance. Benchmarking to RTFA means that if that is approved by the European Commission, Genesis QA will effectively also have approval for practical purposes.							
ISCC	Operational	Not assessed	Not assessed	Based on RED criteria	Yes	No	No	No
	Aims to be applicable to all feedstocks in all regions, certification taken place in EU and SE Asia, in preparation for the Americas. Standard developed based on RED criteria. RFA benchmarking shows it would not qualify for RTFO as self-certification by producers followed by small auditing samples (3% in EU, 5% rest of the world) does not provide adequate assurance.							
LEAF	Operational	No	No	Yes	No	Qualifying Standard	No	No
	UK + 17 other countries; oilseed rape, sugar beet, wheat. Latest version (not benchmarked) updated to include clauses on conserving land with high carbon stocks.							
REDcert	Operational	Not assessed	Not assessed	Based on RED criteria	Unkwown	Not assessed	Not assessed	No
	Global, with emphasis on access to European market; all feedstocks. Built from ground up to ensure legal compliance with German framework - including RED. First farm audits took place in Jun 2010. Designed to be applicable at different stages of supply chain - feedstock production, milling and processing into biofuels.							
RSPO	Operational	Yes	No	Yes	Yes	Qualifying Standard	Qualifying Standard	No
	Indonesia, Malaysia, Papua New Guniea; Palm oil. Steps take to simplify GreenPalm certificate trading from 2011. Published voluntary guidance on land use and biogas capture in July 2010 for producers wishing to comply with RED, used only if applicant specifically asks to be audited on this.							
RSB	Under development	Yes	Yes	Yes	Yes	Qualifying Standard	Qualifying Standard	Under development
	Aims to be applicable to all feedstocks in all regions. First certificates due to be issued early 2011. RED Annex published in March 2010 and updated in June 2010 offers guidance on land with high biodiversity and carbon stocks.							
RTFA (ACCS)[c]	Operational	Yes	No	Yes	Yes	Qualifying Standard	No	No
	UK (England and Wales); wheat, oilseed rape and sugar beet. Formerly the Assured Combinable Crops Scheme (ACCS), has submitted to the EC for recognition as RED compliant scheme. RED amendments due to come into effect in Oct 2011.							
RTRS	Operational	Yes	No	Yes	Yes	Qualifying Standard	Meta-Standard	No
	Argentina, Brazil, Paraguay, Indonesia; soy. Submitted RED annex for EC approval in August 2010.							
SAN/RA	Operational	Yes	No	Unknown	Unknown	Qualifying Standard	Qualifying Standard	No
	19 countries, main concentration currently in Latin America; palm, soy, sugar cane, sunflower.							

BSI - Better Sugar Cane Initiative, **FSC** - Forest Stewardship Council, **Genesis QA** - Genesis Quality Assurance, **ISCC** - International Sustainability & Carbon Certification, **LEAF** - Linking Environment And Farming, **RSB** - Roundtable on Sustainable Biofuels, **RSPO** - Roundtable on Sustainable Palm Oil, **RTRS** - Round Table on Responsible Soy, **RTFA** - Red Tractor Farm Assurance, **SAN/RA** - Sustainable Agriculture Standard/ Rainforest Alliance

a The RFA has now stopped benchmarking against known RED criteria so newer standards have not been assessed. This benchmarking was done to provide early guidance for industry and alert standards bodies to possible areas of non-compliance. With the EC expected to publish its own assessment of standards submitted for recognition in April 2011, it was felt further RFA *RED-Ready* benchmarking would not be valuable.
b Met full Social Meta-Standard in Year Two
c Met full Environmental Meta-Standard in Year Two

'The RFA was pioneering in the development of the RTFO Meta-Standard reporting system'

need addressing by standards owners if they wish to enable those using their standards to access the European market after RED implementation. This benchmarking is only meant as guidance and recognition of RED-compliant schemes will, of course, come from the EC rather than ourselves.

Table 4.5 shows the current status of benchmarking at the time of writing. The table assesses 'RED Ready' standards or those with RED annexes where they exist.

The future of standards

Historically, feedstock standards have been voluntary tools developed by industry or NGOs, often in collaboration. Their aims have typically been to both encourage best practice as well as to rule out particularly damaging industry behaviours. As we look to the future, the implementation of the Renewable Energy Directive is shifting the regulatory landscape and creating a new role for standards, which are expected to be the most common route towards proving that feedstocks meet the RED's sustainability criteria.

It is too early to fully assess how the overall effect of this change in the regulatory environment will play out. On the one hand, it might be expected to provide a stimulus to existing voluntary schemes and encourage the development of similar ones. However, the RED requirements are primarily focussed on avoiding worst practice rather than promoting the best. Schemes that develop in response to the RED requirements might therefore be expected to include those whose aspirations are legal compliance rather than promoting improvements in practices.

Thus far, there is evidence of both types of standard developing. 'Traditional' voluntary schemes such as the Better Sugarcane Initiative and the Round Table on Responsible Soy have taken action to adapt their standards to meet the particular RED requirements, whilst maintaining their focus on more far reaching sustainability improvements. At the same time, new standards, most notably the German based 'RED Cert' and the French 2BSvs, have been developing with the express objective to meet the minimum regulatory requirements.

At this stage, no standards have been approved by the European Commission, but at least nine schemes have now been submitted for assessment.

At the time of writing, the latest indication from the EC was that it would be likely to begin publishing its assessment of submitted schemes in April 2011.

Section 5

Concluding remarks

Concluding remarks

Our Report on the second year of the RTFO is necessarily concerned with the Obligation period ending in April 2010. These remarks provide an opportunity to reflect on the subsequent nine months and look at the report in the context of a more current view of the Obligation.

Reporting

Depending on where one sits among the various lobbies, it might be argued that performance in the second year of the RTFO is an improvement on the first. However, it might equally be reasonably claimed that achievements against targets are poorer than in year one. What is certainly true is that the extremes of performance betray both that voluntary schemes are imperfect if not everyone takes part and that once again, it can be shown that it is entirely possible to procure large volumes of sustainable biofuels.

As Europe moves to implement the mandatory carbon and sustainability requirements of the RED, it will be interesting to see if the early-mover advantage that the UK's obligated suppliers should have enjoyed will pay them dividends. The implications of failing to meet the requirements move beyond the situation in the UK today, where corporate environmental reputations may be affected, to one with potentially significant financial consequences. The pass/fail nature of the Renewable Energy Directive quite simply does not allow for non-compliance: fuels that fail to meet the criteria cannot be counted towards suppliers' obligations. In the UK therefore, a supplier whose fuels failed to meet the criteria would have to buy qualifying RTFCs if available, or pay the buy-out for every litre of their obligation shortfall: the magnitude of the financial exposure for many companies would be tens of millions of pounds.

Some suppliers have already risen to the opportunity that 'understanding supply chains better' presents and the enhanced degree of control that this affords. In these especially, the gap between provisional and verified data has closed, testament to the improving data capture systems of reporting companies. The breadth of feedstocks and countries of origin has diversified, perhaps reflecting not just more sophisticated data capture, but also the widening number of suppliers as a more sizeable global market emerges.

The mandatory threshold for biofuel sustainability in the RED is welcome, but what will drive excellence in sustainability in the coming years? Perhaps foresight. Many have criticised the RED for having 'lower' standards (than the RTFO), but it is clear to me that this was a necessary 'entry level' concession to ensure Europe-wide adoption.

Over time, pressure both from those with a social and environmental agenda, and also from companies who recognise that 'sustainability' is a key business metric will lead to increased expectations being made of measurable sustainability performance.

The Agency

Our machinery of reporting, analysing and publishing has become slicker with practice. Now emulated in many countries, the bespoke online reporting software we use (ROS) is continuously adapted and is now being enhanced to become compliant with the emerging requirements of RED. The mechanics of verification have developed too, but these have some way to go if they are to offer stand-alone assurance of the standard expected.

For the first time, we have operated the 'buy-out' element of the scheme and exercised our powers to levy penalties for non-compliance with the Order. Biofuel regulation remains a new field and the lessons learned, both about the practical processes and the design of legislation will prove invaluable for the coming years.

Our regular provisional data reporting and trend analysis was cited widely and used to inform policy-making. Around the world, users of our datasets ranged from market analysts to academia, and from biofuel proponents to NGOs concerned about the impacts of biofuels. It is a source of great pride to the RFA that its data is accepted universally as accurate and reliable.

iLUC

Since the findings of the Gallagher Review were published during the Agency's first year, the very difficult questions raised by indirect effects have continued to dominate the agenda not just for biofuels, but increasingly, wider land use. We are very pleased that the subject has not, as it often appeared many wished it to be, been pushed aside as 'too difficult'. We maintain our view that solutions to the issue should be integrated into the policy framework as soon as

possible, both to ensure that biofuels deliver on their promise, but also so that industry can move forward with confidence.

The future

Year Three and beyond continues to be filled with many 'known unknowns'. We now expect the Government to consult on its approach to implementing the RED shortly which will clarify many, if not all of the practical issues for the obligated parties.

We also know that, following the Government's announcement in October 2010, that the Agency's duties are expected to be transferred into the Department for Transport during the fourth Obligation reporting year.

The Board of the Agency have committed to ensuring a seamless transition of the processes. Nevertheless, even putting the impacts of the abolition of the Agency to one side, the fourth year of the RTFO looks challenging and many complex issues remain. For example, the availability of standards for emerging feed stocks presents real difficulties for suppliers. This, I fear, will be an unpleasant wake-up call for many suppliers. Similarly, verification, which is still a young discipline in the biofuels industry, will need to be able to cope with the internationalising of the market. To this end, I hope that this can be eased by the work of REFUREC – the renewable fuels regulators' club, initiated by the RFA and now a regular forum for those charged with administering Member States' implementation of the RED.

In conclusion

Biofuels are not only a certain (and rising) percentage of the road fuel transport future in the UK, the European Union and globally, but are also likely to continue to be controversial, in no small part because of increasing understanding about land use. The paradox of biofuels remains that precisely because of the scrutiny paid to the relatively modest volumes currently taken, our wider understanding of the effects, both direct and indirect will, in turn, lead us to question our agricultural and waste management processes, among others, more widely.

Within ten years, we foresee an annual European market of 20 to 30 billion litres of biofuels, even allowing for the optimistic projections of electric vehicle penetration. Our love affair with the car shows no sign of diminishing and while the internal combustion engine dominates, biofuels are the most likely route to reduced carbon emissions and for securing transport fuels against rising demand.

These increasing volumes of fuel will require ever greater stewardship, particularly in the difficult field of sustainability and as third (and perhaps, fourth-generation fuels with their own unique difficulties) emerge in real volumes, and as 'resource management' at large becomes a major international political topic.

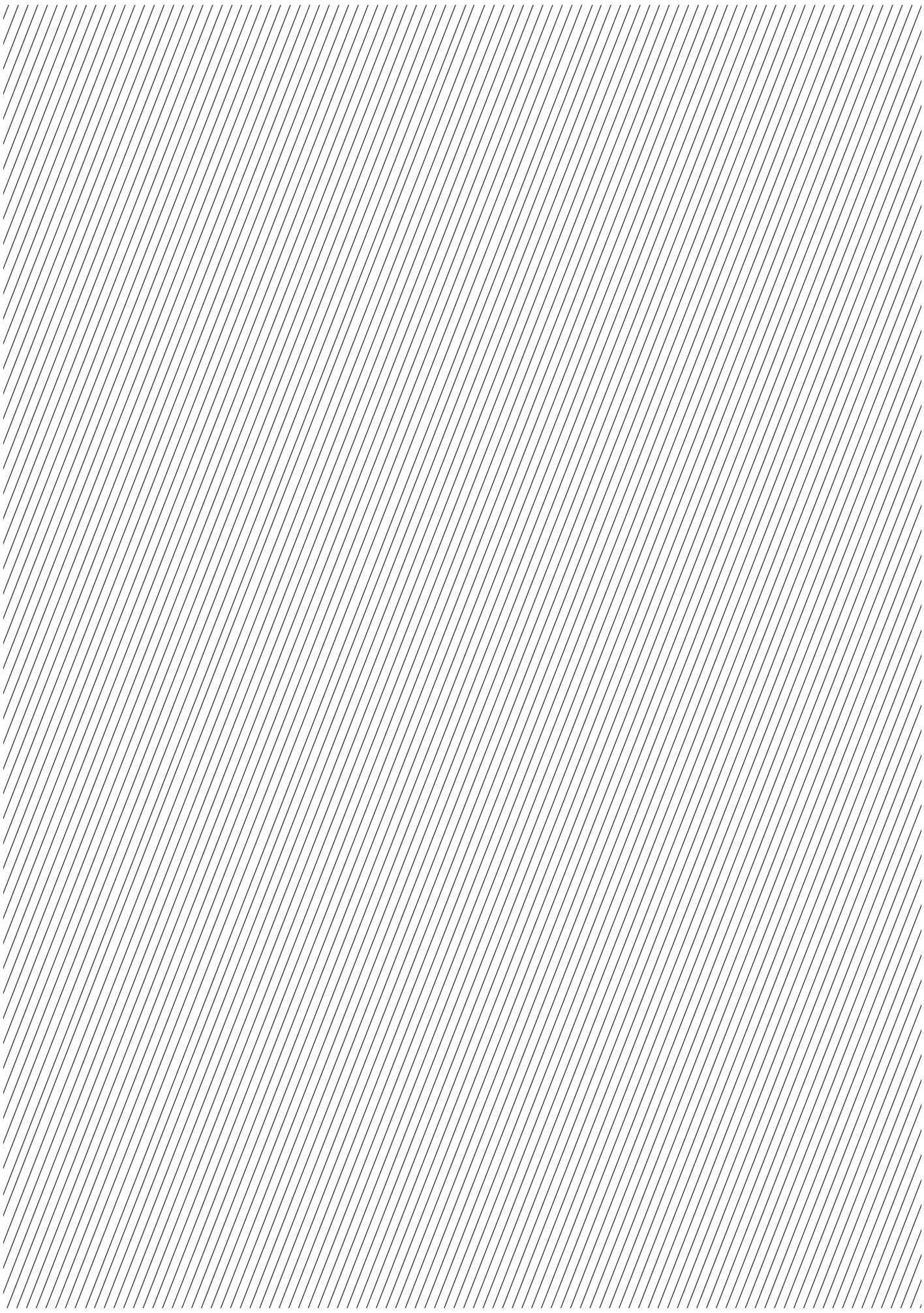
However, the biofuels business remains very new. The Agency is proud to have been at the vanguard of regulating carbon and sustainability issues in this area and, as we approach the end of the third year of the obligation, we trust that those who understand that sustainability is not an option, rise to the challenge and continue our work to 2020 and beyond.

Nick Goodall
Chief Executive

7 January 2011

Acronyms and abbreviations

2BSvs – French sustainability scheme for RED compliance
AAPRESID – Argentinean no-till farmers association
ACCS – Assured Combinable Crops Scheme
BSI – Better Sugarcane Initiative
C&S – Carbon and sustainability
CO_2 – carbon dioxide
CO_2e – carbon dioxide equivalent
DECC – Department for Energy and Climate Change
DDGS – Dried distillers grains and solubles
Defra – Department for Environment Food and Rural Affairs
DfT – Department for Transport
EC – European Commission
EFTA – European Free Trade Association
EU – European Union
EUROPIA – European Petroleum Industry Association
FAME – fatty acid methyl ester
FAO – Food and Agricultural Organisation (of the United Nations)
FSC – Forest Stewardship Council
FQD – Fuel Quality Directive
GDP – gross domestic product
GHG – greenhouse gas
GM – genetically modified
ha – hectare
HGCA – Home Grown Cereals Authority
HMRC – Her Majesty's Revenue and Customs
HVO – hydrogenated vegetable oil
IEEP – Institute for European Environmental Policy
IFPRI – International Food Policy Research Institute
IFRS – International Financial Reporting Standards
iLUC – indirect land-use change
IPIECA – International Petroleum Industry Environmental Conservation Association
ISCC – International Sustainability and Carbon Certification
ISO – International Organisation for Standardisation
ISAE – International Standard on Assurance Engagements
LCA – lifecycle analysis
LEAF – Linking Environment and Farming
MSW – municipal solid waste
NDPB – non-departmental public body
NFU – National Farmers Union
NGO – non-governmental organisation
Ofgem – The UK's energy market regulator
OSR – oilseed rape
PPO – pure plant oil
POME – palm oil mill effluent
QS – Qualifying Standard
RED – Renewable Energy Directive
REDcert – German scheme for biomass sustainability under RED
REFUREC – Renewable Fuel Regulators Club
RFA – Renewable Fuels Agency
RO – Renewables Obligation
ROS – RFA operating system
RSB – Roundtable on Sustainable Biofuel
RSPO – Roundtable on Sustainable Palm Oil
RTFA – Red Tractor Farm Assurance
RTFC – renewable transport fuel certificate
RTFO – Renewable Transport Fuel Obligation
RTRS – Roundtable on Responsible Soy
SAN/RA – Sustainable Agriculture Network/Rainforest Alliance
UCO – used cooking oil



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ISBN 978-0-10-850968-1
9 780108 509681