Renewable Fuels Agency

Year One of the RTFO

Renewable Fuels Agency report on the Renewable Transport Fuel Obligation

2008/09

Renewable Fuels Agency 2008/09 Annual Report to Parliament on the Renewable Transport Fuel Obligation

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Contents

The oildrop images on the section divider pages represent the five main biofuel feedstocks reported in the UK during the first year of the RTFO, ordered by volume in litres: soy - 438m, oilseed rape - 324m, sugar cane - 180m, palm - 127m, tallow - 115m.

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Section 1
Introduction

Foreword

This report by the Renewable Fuels Agency completes the reporting cycle of the first year of the Renewable Transport Fuel Obligation. Since our first monthly report was published in July 2008, we have provided increasingly detailed information about the biofuels supplied for the UK market. Until now this information was provisional, and, although checked by us, was published as reported by the suppliers.

This is the first time anywhere in the world that collated and verified information about the quantity of biofuels supplied, their direct effects and their sustainability has been published. Over 94% of the reported data we are presenting in this report has been independently verified.

In addition to the data about direct effects, this report also looks more broadly at the impact, both in the UK and internationally, of biofuels used for road transport.

In February 2008 I was asked by the Secretary of State for Transport to review the indirect impacts of biofuels. In July of that year, we published the Gallagher Review, which concluded that these effects could not be ignored and had impacts on both food prices and the greenhouse gas savings claimed for biofuels.

We called for further research to map out more clearly how truly sustainable biofuels could be produced. This included the use of idle land to grow biofuels, the use of new technologies and biofuels from appropriate wastes and residues.

The European Commission must now report on indirect land-use change by December 2010. Our report describes a methodology for identifying agricultural systems in which indirect land-use change can be avoided and sets out five cases in which we believe this can be achieved. Incentivising the adoption of such systems would, in our opinion, represent a valuable addition to any future regulatory system.

The UK is now preparing for the introduction of mandatory sustainability standards under the Renewable Energy Directive and we expect to be asked to implement these new rules. In doing so, we will continue to operate with a commitment to openness, transparency and full consultation with our stakeholders, providing information, analysis and data to help Government formulate biofuels policy and for consumers to make informed fuel purchasing decisions.

Finally, I would like to thank our staff for their hard and productive work and for the positive way they are facing the challenges ahead.

Professor Ed Gallagher
Chair

4 January 2010

Executive Summary

Supply of biofuel

In 2008/09, the first year of operation, the Renewable Transport Fuel Obligation (RTFO) met its objective of driving a market for biofuels in the UK. 2.7% of the UK's total road transport fuel supply was biofuel, which was slightly over the Government's target of 2.5% and more than twice the supply of biofuel in 2007/08.

All of the suppliers obligated under the RTFO met their Obligations in full by redeeming Renewable Transport Fuel Certificates. None of the obligated suppliers paid to 'buy-out'[1] of their obligations. Fuel was supplied from at least 18 countries, and at least 12 different feedstocks.

	Government target for 2008/09	Performance 2008/09
Percentage of feedstock meeting a Qualifying Environmental Standard	30%	20%
Annual GHG saving of fuel supplied	40%	46%
Data reporting of renewable fuel characteristics	50%	64%

Table 1.1: Government targets vs. performance

Of the carbon and sustainability data reported to the RFA, 94.3% was verified, 0.3% came from small suppliers and was not subject to verification, and the remaining 5.4% did not receive the limited assurance verification required.

Supplier environmental performance

The environmental sustainability of the RTFO overall is dependent upon the performance of suppliers in sourcing sustainable fuels. Here, the results are polarised, with a very wide range. On the one hand, a number of suppliers performed well, including ConocoPhillips, Greenergy and Mabanaft, who met all three of the Government's targets with fully verified datasets. The success of these companies demonstrates that the RTFO reporting system has been effective in several cases, and that it is possible to integrate sustainability into procurement policies.

It also highlights those at the other end of the scale, where a number performed poorly, including Morgan Stanley and Topaz who failed to meet any of the targets, and Chevron and Total who met only one. BP reported meeting two targets, and Murco reported meeting one, but their verifiers were unable to provide the limited level of assurance required for their data to be acceptable. Significant improvement will be required by all suppliers to meet the challenges of mandatory sustainability requirements under the EU's forthcoming Renewable Energy Directive (RED).

Number of targets met		Fossil fuel company
3		ConocoPhillips
		Greenergy
		Lissan[a]
		Mabanaft
2		Esso
		Harvest
		Petroplus
		Shell
1		Chevron
		Total
0		Morgan Stanley
No limited assurance. Targets claimed:	3	Prax
	2	BP[b]
	1	Murco
	0	Topaz

a Lissan, as a low volume supplier of biofuels, were not required to verify their data.

b BP submitted a revised Annual Report after the deadline in which some of their data was verified.

Table 1.2: Number of targets met by each fossil fuel company

1 The RTFO includes a mechanism that allows suppliers to 'buy-out' all or part of their obligation rather than redeem certificates. Set at 15p per litre for 2008/09, the buy-out mechanism is intended to ensure the supply of biofuels in normal market conditions and act as a safety valve in the case that feedstock prices rise too high.

2.7%

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

Carbon emissions

Lifecycle savings, direct effects

Based on the RFA's lifecycle analysis methodology, the fuels supplied under the RTFO in 2008/09 delivered a 46% carbon saving compared to the equivalent fossil fuels, a reduction in carbon emissions of 1.6 million tonnes of CO_2e. This is in excess of the Government's target of 40% savings and consistent with the Government's Regulatory Impact Assessment (2007). From 2010, the RED will require 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 2008/09, 42% of previous land-use was reported as 'unknown', this was due to a lack of verifiable evidence gathered from supply chains. Emissions from any unknown land-use change are not taken into account in the carbon savings figure above and it is possible that some fraction of the unknown land-use change may have caused a significant release of stored carbon. Under the RED, suppliers will have to demonstrate that their feedstocks were not sourced from carbon rich land.

There are examples of good practice where tracking actual carbon emissions data has allowed suppliers to report substantially better than default emissions savings, e.g. 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 collection for palm oil mill effluent also offer large potential savings.

Indirect effects

The indirect effects of biofuels are currently unaccounted for in the RTFO carbon methodology. The Gallagher Review found that greenhouse gas emissions from indirect land-use change driven by the use of biofuels could be very large. If left unchecked, these could potentially cause an increase in overall carbon emissions rather than a reduction. However, it is extremely challenging to assess the impacts accurately and precisely.

The RFA's programme of work since the Gallagher Review has included developing a practical methodology to define conditions in which biofuel feedstock cultivation projects can demonstrably avoid unwanted indirect effects. The report describes 'real life' case studies, including the cultivation of palm oil onto low value *Imperata*[2] grasslands in Indonesia, integrated cattle and soy farming in Brazil and increasing sugar cane yields in the Philippines. In these cases we have found that it should be possible, by targeting biofuel crop expansion into appropriate situations and applying good agricultural practice, to significantly reduce the risk of indirect land-use change. Such measures should have the dual benefit of reducing impacts on food prices.

If agricultural expansion for biofuel production can be effectively incentivised to follow these suggested paths, it should be possible to produce very substantial volumes of biofuel without causing indirect land-use change. If coupled with good practice on environmental and social sustainability in general, this provides the promise of fully sustainable biofuels from crops.

We have also looked at the indirect effects of diverting wastes and by-products to biofuel use. Where such products have existing uses, it is possible that diversion to biofuel could actually result in a net increase in emissions. While there is still substantial uncertainty around these indirect effects, we have been able to identify with confidence: cases where indirect effects will reduce the benefits of using wastes and by-products, such as UK tallow; and cases where the indirect effects will actually enhance the benefits, such as methane from UK municipal solid waste (MSW). This information will provide an important contribution to the debate on which biofuel feedstocks should be categorised as 'wastes and residues' and count twice towards targets under the RED.

Agriculture

The UK biofuels market driven by the RTFO is yet to have a large impact on agriculture in the UK. Biofuels from UK grown crops made up at least five percent of the total supplied under the RTFO in 2008/09. Although the RTFO has absorbed about four percent of the annual UK oilseed rape crop and about eight percent of the sugar beet crop, overall the quantities of biofuel sourced from UK crops are still relatively low. There is, however, optimism in UK agriculture that as the biofuel market grows, it will provide a valuable alternative market for agricultural commodities. Biofuels crops for the RTFO have used an estimated 33,000 hectares (ha) of land in the UK.

2 Areas of cleared forest in Indonesia have become overgrown by *Imperata*. This grass prevents the land from developing naturally into secondary forest and is therefore considered to be problematic (Reinhardt et al., 2007).

Biofuels from crops grown overseas made up at least 64% of the total supplied under the RTFO in 2008/09. It is estimated that about 1.3 Mha of land outside the UK were used for crops producing biofuel feedstocks for the UK market, primarily soy in the USA and Argentina and oilseed rape in Germany. The amount of land used for soy is particularly high because of its relatively low yield of oil per hectare. However, the co-products such as soy meal provide much of soy's value as a crop.

There are several areas in which changes to typical agricultural practice may be able to deliver reductions in greenhouse gas emissions. The biofuels market may be a driver for these improvements, especially if effective incentivisation of biofuels delivering better carbon savings is introduced. The application of the RTFO Meta-Standard for auditing sugar cane cultivation in Brazil is an example of the RTFO already driving a wider improvement in agricultural sustainability, with the audited plantations supplying sugar not only for ethanol but also for food use.

The RTFO has resulted in additions to several existing sustainability standards. The UK's Assured Combinable Crops Scheme standard was enhanced to provide assurance against loss of carbon stocks in order to meet the RTFO Meta-Standard. The Round Table on Responsible Soy has also been enhanced following input from the RFA – the social criteria of the latest version are now fully compliant with the Meta-Standard.

The RTFO has not yet, however, driven a significant increase in markets for sustainable certified feedstock from overseas – for instance, only 0.5% of palm oil was reported as Roundtable on Sustainable Palm Oil certified despite a large surplus of certified feedstock on the market in 2008/09.

Other economic activities

Although an effective driver of the market for biofuel, the RTFO did not, during 2008/09, drive increases in biofuel production capacity in the UK. While anticipation of the RTFO may have been a factor in several planned facilities, adverse market conditions have resulted in several planned investments failing to materialise. Perhaps the most important adverse external factor for UK production was the existence of US subsidies that have since been judged unfair by the EC. More recently, the application of countervailing tariffs for US imports has been accompanied by reductions in volumes of biodiesel reported from US soy.

There is evidence that a number of factors have contributed to a difficult investment environment in the UK. These include the US subsidies, the identification of a discrepancy[3] in the RTFO, a reduction in the expected volume targets under the RTFO and the general economic climate. A period of market stability may help investor confidence to be rebuilt.

The costs of biofuel production were such in 2008/09 that it was possible to supply biofuel profitably, given the 20p per litre tax incentive, without needing to recoup value from certificates. Fossil fuel suppliers that have blended biofuel under the RTFO have therefore actually been able to achieve a cost saving. This is likely to have affected the value of RTFCs, which was expected to reflect the additional cost of biofuel over fossil fuels. There is also evidence from consultation with suppliers that the identification of the discrepancy in the RTFO caused a reduction in demand for, and value of, RTFCs. It has been reported by suppliers that the value of RTFCs fell towards zero directly after the discrepancy was announced.

With the expected removal of the duty incentive for liquid biofuels, except biodiesel from used cooking oil, in April 2010, the ability to derive value through trading certificates is likely to become much more important to biofuel production businesses in future.

Sustainable development

Agriculture is a significant contributor to the GDP of many developing economies. In 2008/09, 24% of the biofuel used in the UK came from Brazil, Argentina, Malaysia and Indonesia (with small volumes imported from Pakistan and Malawi). This represents a revenue stream potentially worth in excess of £100 million per annum to the developing world. In

3 The discrepancy was that fossil fuel blended with biofuel before the duty point did not incur an obligation. This was rectified for the 2009/10 reporting year.

2008, however, the Gallagher Review identified that biofuels still only accounted for about 1% of global cropland.

Biofuel cultivation and production industries support a large number of jobs in exporter countries, but our case studies of Brazilian sugar cane (14% of reported fuel came from sugar cane) and Malaysian palm oil (10% of reported fuel came from palm oil) production demonstrate that increased export earnings for the country at large do not necessarily translate into sustainable development for rural communities.

In Malaysia, oil palm cultivation generates 5% of GDP. However, in parts of Malaysia, palm oil expansion continues to be a driver of land conflict. Where local and indigenous communities lose access to land, they lose access to forest resources that can provide food and income security. Plantations are large employers, providing jobs to Malaysians and immigrant workers, but in many cases estate wages may not be enough to lift people out of poverty. Nevertheless, smallholders should be able to achieve good returns from palm plantations, and increased uptake of the Roundtable for Sustainable Palm Oil initiative should result in improved conditions for workers and locals.

In Brazil, sugar cane cultivation is important to the economy, generating 2.5% of GDP, with the ethanol industry contributing a further 1.1%. Wages for sugar cane workers are typically higher than in other areas of agriculture, although cane production is not considered to have a significant overall positive impact on poverty or inequity, and may lead to concentration of wealth. The Brazilian sugar cane industry has been criticised by the media and NGOs for social problems, particularly in relation to working conditions of the large manual workforce used in harvesting and the use of forced and child labour. Both the Brazilian government and industry are making significant efforts to improve the working conditions and eradicate bonded labour and use of underage workers.

In general, while biofuels have the potential to improve livelihoods in the developing world, expanded agricultural production is not guaranteed to be a driver of sustainable development. Ensuring smallholder involvement and adoption of decent living wages is likely to improve outcomes for poor people's livelihoods.

The environment generally

Expansion of agricultural area to support biofuel production, as with any agricultural commodities, may threaten biodiversity. The implementation of sustainability criteria consistent with the RTFO Meta-Standard is likely to reduce the risk of such impacts. The Renewable Energy Directive sustainability criteria will provide protection for highly biodiverse areas. Potential consequences of biofuel agriculture include soil erosion and water pollution. In addition, the use of agricultural chemicals and burning of crops in some countries can cause air pollution. The application of environmental sustainability criteria can also provide some assurance against this.

In the UK, almost ubiquitous application of sustainability schemes for biofuel agriculture provides good assurance. 99% of fuel from the UK met environmental sustainability standards. Of the 20% of fuel meeting environmental sustainability standards for the RTFO as a whole, 18% was either from UK crops, or produced from wastes or by-products.

On the other hand, only 4% of the fuel from feedstocks cultivated outside the UK met sustainability standards. Clearly, this provides little assurance about the way the feedstock was grown and any environmental and social impacts it may have had.

The effectiveness of the Administrator

In 2008/09, we have delivered value for money, and performed all the functions required of us by the RTFO Order. All obligated parties under the RTFO have been identified, and met their Obligations in 2008/09 by the redemption of certificates. There was only one case of erroneous award of certificates, which was corrected, and no known award of certificates to fraudulent claimants. Our annual stakeholder surveys have demonstrated a high level of satisfaction with our work.

The Gallagher Review, which we published in July 2008, was widely praised as an important contribution to the debate on the indirect effects of biofuels production. Our ongoing programme of research aims to take this contribution forward. Our recent work on avoiding indirect land-use change has had a positive initial reception from experts in the field. We have been actively involved in sharing our work on indirect effects and sustainable biofuel production with stakeholders not only within the UK, but also throughout the European Union and globally.

Most of all, our reporting on the biofuels supplied under the RTFO is world leading, not only by being the first data of this kind to be released, but in demonstrating a commitment to providing the public with environmental data as promptly as possible in the most useful practical format. We expect this reporting to be a benchmark for biofuel sustainability reporting internationally in the years to come.

Introduction

This is the Renewable Fuels Agency's first Annual Report to Parliament on the Renewable Transport Fuel Obligation, covering the period 15 April 2008 – 14 April 2009, as required under the Renewable Transport Fuel Obligations Order 2007 (as amended).

The aim of this report is to provide a post-implementation review of the first year of the Renewable Transport Fuel Obligation (RTFO), and includes 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 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 five percent biofuel can be sold without additional labelling. This will rise to seven percent for biodiesel from 1 April 2010. An increase in ethanol blending is also likely in the future. It is also possible to use higher blends of biofuel (e.g. B100 - 100% biodiesel and E85 - 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 RTFO sets targets for increasing the use of renewable fuels in UK road transport with the aim of reducing carbon emissions. The RTFO is likely to be the basis of the implementation of the transport element of the EU's Renewable Energy Directive (RED), which 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 ('obligated suppliers'). In 2008/09, the Obligation was to ensure that 2.5%[1] 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 Renewable Fuels Agency (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.

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 RTFO is set to become the prime mechanism to support the supply of biofuels in the UK (a 20p per litre duty incentive is due to be removed from April 2010, except for biofuel from used cooking oil which will retain the duty incentive for a further two years). The value of certificates, as tradable commodities, is determined by the market.

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' – if the additional marginal cost of supplying biofuel compared to fossil fuel were to rise above 15p per litre (or 35p per litre taking into account the current duty incentive), suppliers would be able to meet their Obligation more cheaply by paying the buy-out than by supplying biofuel.

1 The legal Obligation in 2008/09 was effectively reduced by over half by a discrepancy in the RTFO Order, see *Performance of the RFA*, page 11.

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

The Renewable Fuels Agency
The RFA is the UK’s independent sustainable fuels regulator, charged by the UK Government with running the RTFO. It awards Renewable Transport Fuel Certificates (RTFCs) to suppliers of biofuels in the UK, ensures that obligated suppliers meet their annual Obligation and runs a world leading carbon and sustainability (C&S) reporting system. The RFA encourages UK suppliers to source the most sustainable biofuels, and its reporting and research helps to move forward the biofuel sustainability agenda.

Suppliers of biofuels claiming RTFCs must report the volume and C&S characteristics of their fuel through our online reporting system. Every month the RFA reports on the biofuels supplied in the UK, every quarter on the performance of individual suppliers and every year the RFA publishes a report such as this on the wider impacts of the RTFO. These reports are the first of their kind in the world.

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 through a range of external publications. The Agency is a small organisation, led by an independent board with six members including our Chief Executive, and with fourteen staff. It was legally created in October 2007 as a Non-Departmental Public Body, sponsored by the Department for Transport.

The C&S 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. Suppliers can report using our default values for fuel type, feedstock and country of origin, or calculate actual emissions using real data.

Sustainability reporting under the RTFO is based on a meta-standard approach. Existing sustainability standards are compared to the RTFO Meta-Standard. 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 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 wastes and by-products 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 like the Better Sugarcane Initiative; has benchmarked the testing versions of developing schemes like the Round Table on Responsible Soy (RTRS); is engaging with existing schemes like the Roundtable on Sustainable Palm Oil (RSPO) 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.

How to read this report

Dates
In general, unless otherwise stated it should be interpreted that the information in this report relates to the 2008/09 RTFO reporting period. The conclusions and opinions expressed here are based on the best data available to us at the time the report was written.

RED and FQD
The EU Renewable Energy Directive (RED), and revisions to the Fuel Quality Directive (FQD), are due to be implemented by December 2010. At various points we have made reference to parts of these directives that are, to the best of our understanding, expected to be included in the UK implementation. The RFA is not a policy setting body, and any commentary we have made 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 RED and FQD, and should be contacted for any enquiries regarding implementation or other aspects of biofuel policy.

Content supported by third party studies

Several chapters and sub-chapters of this document draw on information published in third party studies commissioned by the RFA. These supporting studies are available for download at *www.renewablefuelsagency.gov.uk/yearone*. The content of this report should be understood to represent the views and opinions of the RFA. The content of the supporting studies does not necessarily represent the views and opinions of the RFA. In some cases elements of this report closely reflect sections, in particular the executive summaries, of the supporting documents. The use by the RFA of elements of text taken directly from any supporting study should be taken as indicating that such section of text accurately reflects the views and opinions of the RFA. It should not be taken to necessarily imply that any or all of the other text comprising the supporting study represents the views or opinions of the RFA.

Errors and omissions

In assembling this report, every care has been taken to ensure that the text and any other information contained within it are accurate to the best of our knowledge at 4 January 2010. However, in any document of this length, it is possible that unintended errors or omissions may be introduced. Should you identify any information in this document that you believe to be erroneous, please inform us by emailing contact@rfa.gsi.gov.uk. Where any errors have been identified, errata indicating this will be published on our website *www.renewablefuelsagency.gov.uk/yearone*, alongside the report itself. We recommend that readers should 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 of our duties 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.

The world's first biofuel sustainability regulator

When the RFA was created in November 2007, it became the world's first biofuel sustainability regulator. Tasked with the administration of the RTFO, we became the operators of an entirely new online carbon and sustainability reporting system.

At the core of our duties is the administration of the volume reporting and certificate award mechanism of the RTFO. Our performance of these core duties has been a success. The online reporting system and underlying software database have been working since the launch of the RTFO. We have been able to successfully substantiate (either through reconciliation with HMRC or additional checks) the volumes of fossil fuel and biofuel reported to us. The certificate award and trading systems have both worked, enabling all obligated suppliers to meet their 2008/09 obligations with certificates either earned or traded.

The RTFO goes further than simply creating a market for biofuels – it is also intended to drive biofuel sustainability. The Government has set targets for individual supplier performance on sustainability. Our carbon and sustainability reporting guidance, built around a lifecycle carbon reporting methodology and the RTFO Sustainability Meta-Standard, has achieved a global prominence by virtue of being the first system brought into active regulation. Active engagement with fuel suppliers has enabled a smooth transition to carbon and sustainability reporting, with 73% of those reporting on our system agreeing that while data collection itself may have been challenging, the system is easy for them to use.

The success of the administrative and IT systems was aided by extensive piloting and training with suppliers before the system was operational. This was initially carried out by the Department for Transport and Low Carbon Vehicle Partnership before being handed over to the RFA.

The carbon and sustainability reporting system is based on a meta-standard approach which recognises existing feedstock standards that cover core sustainability principles. However, there is currently a shortage of standards and, even where available, many do not cover the full set of issues, such as carbon stocks, fundamental to biofuel sustainability. We have achieved some success working with standards bodies and individual suppliers to drive towards this standard. 5.2% of the biofuel fuel met the Assured Combinable Crops Scheme which operates in the UK. This standard was strengthened to qualify under the RTFO as a result of engagement between the RFA and the awarding body. We also worked closely with a supplier that took the initiative to undertake an independent audit against the Meta-Standard. These audits allowed an additional 5.8% of total biofuel to be reported as meeting the Environmental and/or Social Qualifying or Meta-Standard.

Beyond 2008/09, our work to support standards development and the implementation of independent auditing by suppliers is continuing. Our reporting is putting pressure on suppliers to perform on sustainability, and our work is helping to make the certified sustainable fuel needed to meet the Government's target increasingly available. We are also continuing to develop our scheme to take into account the latest science and regulatory framework.

On top of the challenging workload anticipated for the Agency in fulfilling our new responsibilities, in February 2008 we were asked by the Secretary of State for Transport to undertake a major review – the 'Gallagher Review of the indirect effects of biofuels production'.

The Gallagher Review, which we published in July 2008, has been widely praised as an important contribution to the debate on the indirect effects of biofuels production, and confirmed our position as a world leader on issues around biofuel sustainability. Our ongoing programme of research is taking this contribution forward. As an example, our recent work on avoiding indirect land-use change has had a very positive initial reception from experts in the field, and is the first practical approach to defining company level activities to avoid indirect land-use change to be laid out with a clear methodology.

There is always room for improvement, and we are committed to continue to act on feedback from stakeholders, to innovate and to work to maximise our operational efficiency and value for money. After the first year of the RTFO, we feel able to assert that by combining effective and efficient administration of the RTFO with cutting edge sustainability reporting and research, we have met our obligation to deliver excellence to the British public. We have also laid the foundation for an increasingly successful biofuels policy in the UK implemented through a developing RTFO.

RTFO drafting discrepancy

In mid October 2008 identified a discrepancy was identified in the RTFO Order. This had been drafted in a way inconsistent, on one point, with the intent of the policy. The legal effect was that any fossil fuel that crossed the 'duty point'1 blended with biofuel was not obligated. The practical effect of this was to more than halve the volume of fossil fuel that was obligated (see *Impacts of the RTFO on UK business*, page 45). This discrepancy was corrected by the Department in an amending order that took effect from the start of the 2009/10 obligation period.

The RFA acted promptly to inform all registered suppliers of this issue and then to keep them informed during the development of the Government's response. We worked closely with the fossil fuel suppliers affected to ensure that their data was correctly entered given the revised understanding of the Order.

We believe that after the identification of the discrepancy, the actions we took were effective in minimising any additional burden on reporting suppliers and demonstrated our commitment to transparent engagement.

Value for money

The RFA demonstrates value for money in a number of ways, as outlined below.

As a small NDPB we rent our accommodation and IT services from our sponsor department (DfT). This enables us to provide a secure hosting environment for the data we collect on fuels supplied into the UK effectively free of charge as our server sits within the pre-existing DfT secure environment.

In 2008/09 the RFA started to use its own standalone accountancy system (for the part of 2007/08 for which we were in existence we used DfT systems). After considering the options available, we chose to utilise a standard, widely used package which presented a considerable saving over implementing a revised system introduced for DfT (which is suitable for much larger organisations). Payroll was outsourced to a bureau.

1 Road fuel duty is payable on fuel supplied into the UK market. The 'duty point' is a technical concept which represents the location of fuel when fuel duty becomes liable – usually at import terminals and oil refineries.

In 2008/09, our budget was £1.5M out of which we spent £1.3M. Of this, £607,000 was spent on staff wages and other remuneration. In order to keep costs to a minimum, the RFA did not fully utilise its call off contract with the consultancy that designed our processes and IT operating system, preferring to rapidly develop our in-house capabilities in this area. Of the £373,500 spent on goods and services via contracts, 88% was awarded competitively. Single tender actions have to be signed off either by the Accounting Officer or the RFA's board depending on their value. Our internal procurement practices were deemed to be acceptable by our internal auditors.

All payments made in 2008/09 were correct and made within the Government's target for public sector organisations of 30 days.

Our accounts for 2008/09 were approved by the Comptroller and Auditor General on 9 July 2009 and laid before the House on 15 July 2009.

Our most recent stakeholder survey (November 2009) demonstrates that our stakeholders are generally happy with our performance. The full results are available on the RFA website.

- 86% said that they were either fairly, very or extremely happy with the quality of our monthly and quarterly reports.
- 93% were fairly, very or extremely happy with the response time to queries raised with the RFA.
- 87% were fairly, very or extremely happy with the quality of the advice they had been given by the RFA.
- 73% agreed that our online data collection system was easy to use.
- However, among users of the ROS[2] system only 52% and 57% agreed with the statements that the RFA was quick to 'raise any necessary questions about … returns' and 'to resolve those questions'. We are in the process of making a number of changes to speed up this process.

2 ROS (RFA Operating System) is the online system which the RFA uses to collect data from suppliers.

‘86% of our stakeholders are happy with the quality of our monthly and quarterly reports’

Advice

By offering clear and appropriately detailed advice we have ensured that suppliers and other stakeholders are able to interact with the RFA in confidence.

The RFA continues to offer advice to stakeholders by a number of methods, including:

- workshops and meetings;
- telephone conference calls;
- publication of detailed guidance manuals;
- news updates (both email and on ROS);
- e-mails and telephone calls on an individual basis.

There have been no formal complaints received by the RFA. However, there have been a number of concerns raised by stakeholders, for example concerning the time taken to respond to requests for advice. These have been addressed by the RFA.

Accuracy

To claim a certificate, suppliers must report the volume of biofuels supplied and the C&S information related to that fuel. The RFA conducted regular checks on the data to identify potential errors and sought corrections from suppliers. 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 regular 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 supplier. 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.

In general, the certificate award system has worked. Approximately 1.3 billion certificates were issued during 2008/09. There was one failure of the control system for awarding certificates in the obligation year 2008/09. On this occasion a supplier was erroneously awarded its certificates twice by the RFA for a particular month which amounted to approximately 54 million certificates. The certificates were removed from the system and there was no effect upon the RTFO as a whole or any supplier in particular. The certificate award system has now been modified and staff trained in the new procedures to ensure that this cannot happen again.

Following these changes, no further erroneous awards have occurred and we consider our systems for operating the RTFO, and in particular for the award of certificates, to be robust. There is a continual program of testing and reviewing of our systems to ensure that they are resilient to the possibility of fraud.

Counter fraud

There have been four attempts to obtain certificates incorrectly; all four were identified at an early stage.

Three cases related to figures for fuel being entered that could not be substantiated or were materially incorrect. In two cases the suppliers involved have now ceased trading and the investigations are closed. In the third case, the supplier has decided not to pursue the application for certificates. Given the circumstances and the small number of certificates involved the RFA has decided to refuse the certificate award and take no further action. The fourth case involved entries onto ROS over a six month period. Following a joint investigation with HMRC the RFA resolved the matter by issuing those certificates that were correctly claimed for; those certificates that were incorrectly claimed for were not issued.

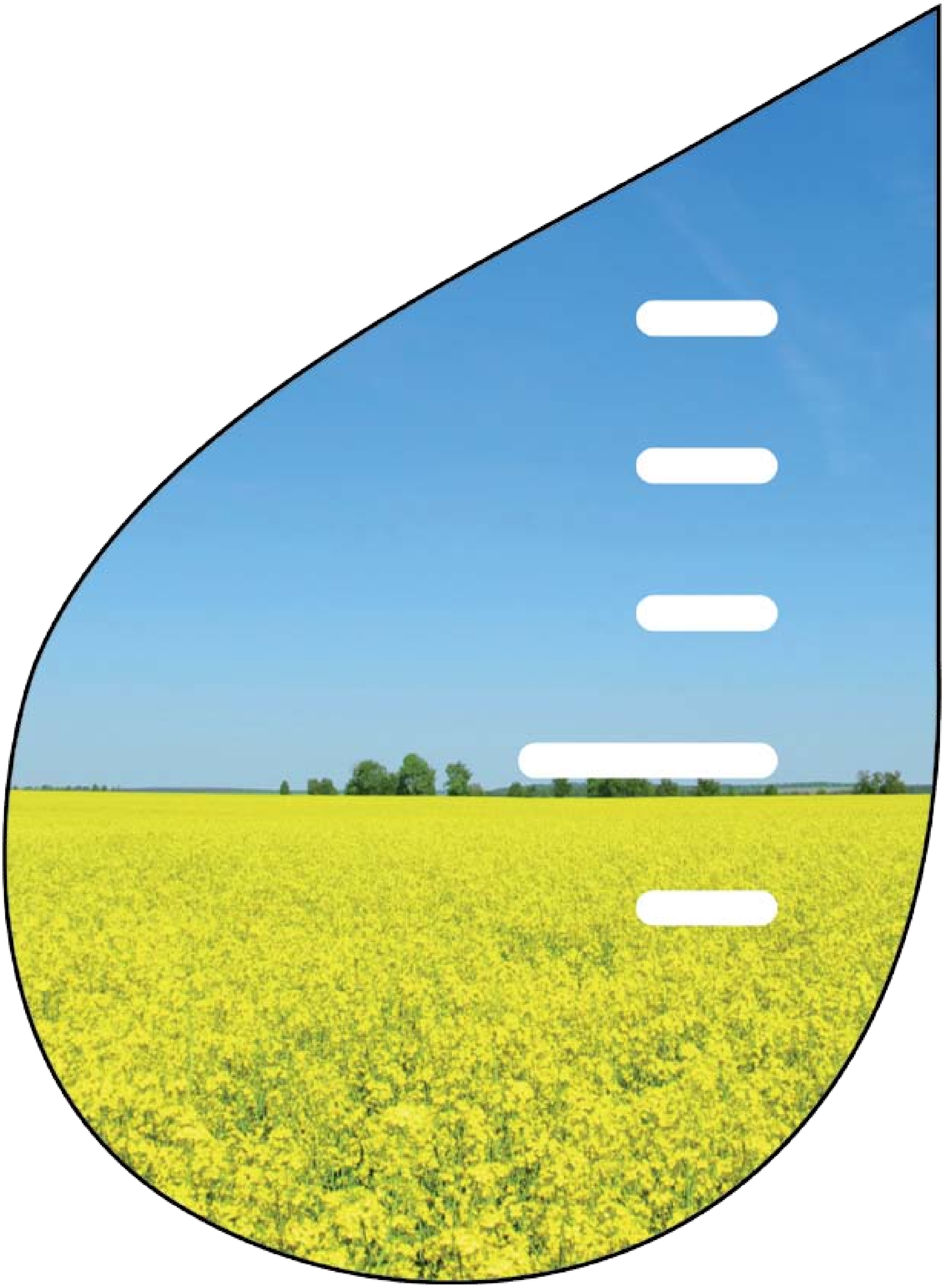
Our counter fraud activities have identified a number of practices which, although they presented no threat to the RTFO, breached HMRC regulations or guidance. These issues have been raised with the relevant teams within HMRC.

In the last year, our counter fraud activities have helped us to continue to build links with other enforcement and regulatory bodies, to ensure a robust and consistent approach. In order to further develop our skill in this area RFA staff have undertaken liaison meetings and attended training events relating to counter fraud and compliance.

Acronyms and abbreviations

ACCS – Assured Combinable Crops Scheme
BRE – Better Regulation Executive
BSI – Better Sugar Cane Initiative
CEN – European Committee for Standardization
CO_2 – carbon dioxide
CO_2e – carbon dioxide equivalent
DECC – Department for Energy and Climate Change
DEFRA – Department for Environment, Food and Rural Affairs
DfT – Department for Transport
DNDC – DeNitrification DeComposition
EC – European Commission
EU – European Union
EUROPIA – European Petroleum Industry Association
FAME – fatty acid methyl ester
FAO – Food and Agriculture Organisation (of the United Nations)
FQD – Fuel Quality Directive
GBEP – Global Bioenergy Partnership
GDP – gross domestic product
GHG – greenhouse gas
ha – hectare
HMRC – Her Majesty's Revenue and Customs
HVO – hydrogenated vegetable oil
iLUC – indirect land-use change
IPCC – Intergovernmental Panel on Climate Change
IPIECA - International Petroleum Industry Environmental Conservation Association
ISO – International Organization for Standardization
ISAE – International Standard on Assurance Engagements
LCA – lifecycle analysis
MSW – municipal solid waste
N_2O – nitrous oxide
OSR – oilseed rape
PPO – pure plant oil
POME – palm oil mill effluent
RED – Renewable Energy Directive
RIA – regulatory impact assessment
RFA – Renewable Fuels Agency
ROS – RFA Operating System
RSB – Roundtable on Sustainable Biofuel
RSPO – Roundtable on Sustainable Palm Oil
RTFC – Renewable Transport Fuel Certificate
RTFO – Renewable Transport Fuel Obligation
RTRS – Round Table on Responsible Soy
SAN/RA – Sustainable Agriculture Network/Rainforest Alliance
UCO – used cooking oil
USDA – United States Department of Agriculture

Section 2
RTFO 2008/09



Year of RTFO results

Of the 2008/09 data, 94.3% has been verified. Another 0.3% of data from smaller suppliers was not subject to verification. The remaining 5.4% is from suppliers who did not adequately verify their data. This 5.4% has not been counted towards overall performance against Government targets.

The 2008/09 supply was dominated by biodiesel, reflecting the fact that biodiesel supply can be more easily integrated into existing infrastructure.

As well as environmental principles, the RTFO Meta-Standard has criteria for social sustainability. In general, sustainability schemes have less coverage of social than environmental criteria, and the proportion of fuel meeting the Social Qualifying Standard has therefore been lower.

The greenhouse gas savings reported do not include any indirect effects, and may not include all emissions from direct land-use change.

1,284m

litres of biofuel were supplied

2.7%

of UK road transport fuel was biofuel, above the Government's target of 2.5%

94.3%

of the data was verified

82%

of biofuel supplied was biodiesel

0.4m

kilograms of biogas was supplied

46%

average greenhouse gas saving was achieved, above the Government's target of 40%

64%

of requested data was reported, above the Government's target of 50%

9%

of fuel came from UK feedstocks

20%

of biofuel feedstocks met the Environmental Qualifying Standard, below the Government's target of 30%

18%

of biofuel feedstocks met the Social Qualifying Standard

67m

litres came from feedstock grown to a qualifying sustainability standard

75m

litres were independently audited to fully meet, or qualify against, the RTFO Meta-Standard

157m

litres came from wastes and by-products

89m

litres came from feedstock grown to a benchmarked standard

99%

of fuel from UK feedstocks met the Environmental Qualifying Standard

Greenhouse gas savings of biofuels by feedstock and country of origin

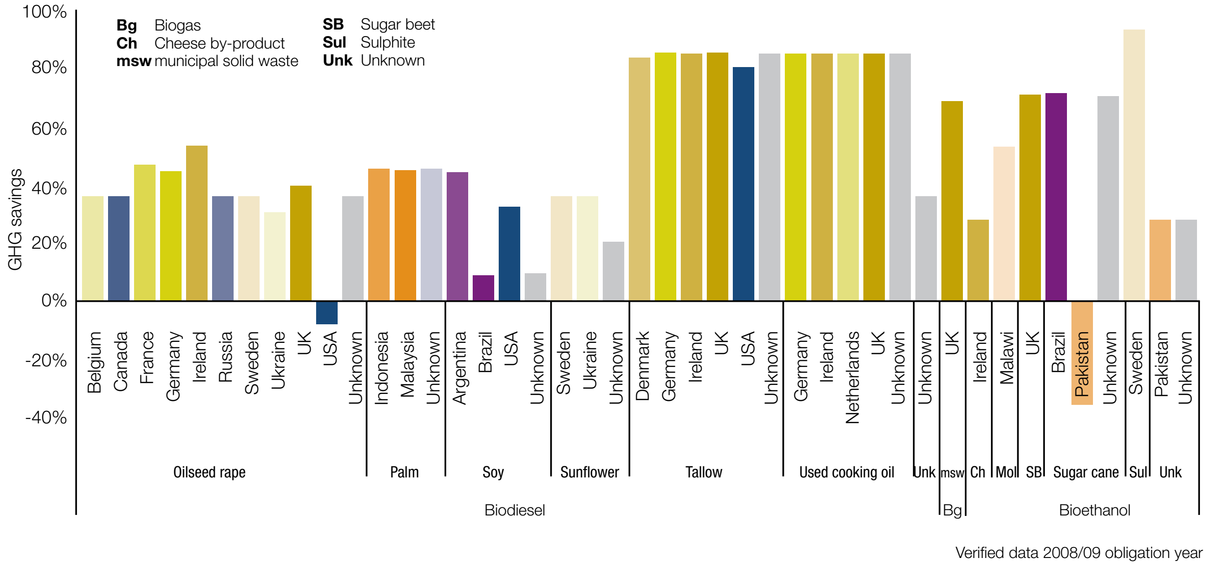


Figure 2.1: GHG savings by feedstock and country

Volumes of biofuel by feedstock and country of origin

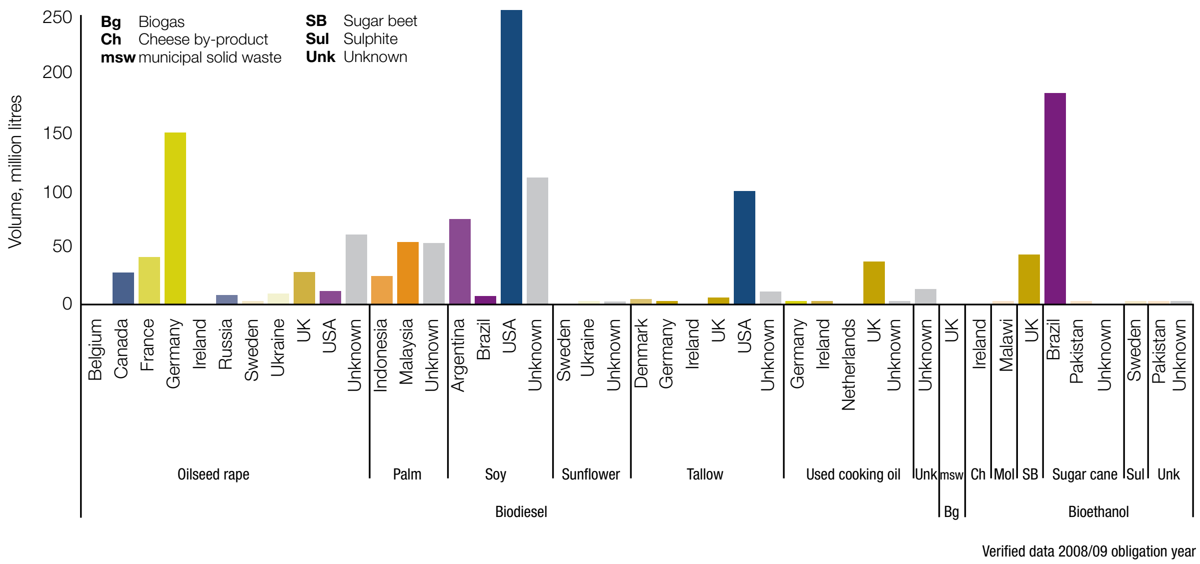


Figure 2.2: Biofuels by feedstock and country

Proportion of biofuel meeting sustainability standards

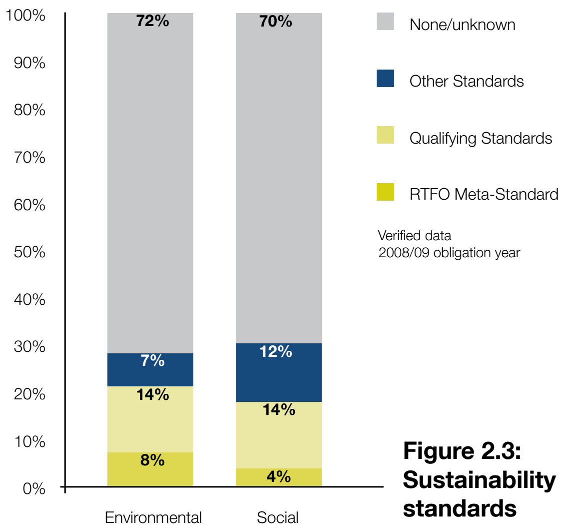


Figure 2.3: Sustainability standards

Data capture

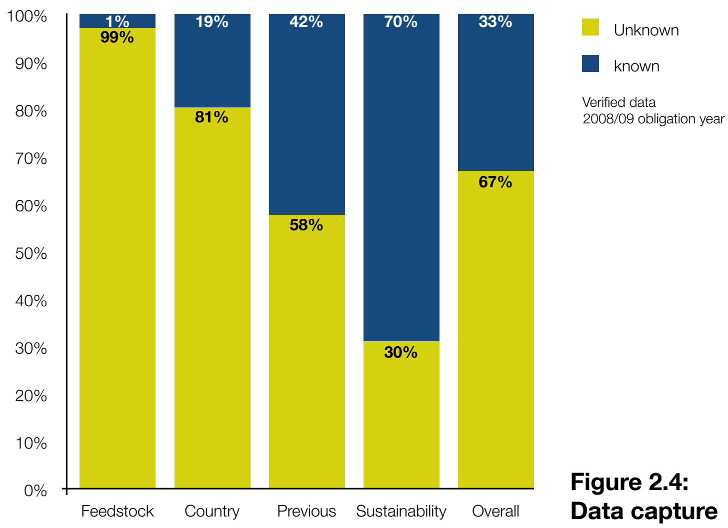


Figure 2.4: Data capture

Supplier compliance with the RTFO

For the 2008/09 obligation period all obligated suppliers[1] met their RTFO obligation by the use of certificates. No obligated supplier needed to pay into the 'buy-out fund', thus for the 2008/09 obligation period the buy-out fund was zero.

Obligated suppliers	
BP Oil UK Ltd	Mabanaft UK Ltd
Chevron Ltd	Morgan Stanley Capital Group Inc
ConocoPhillips Ltd	Murco Petroleum Ltd
Esso Petroleum Company Ltd	Petroplus Refining Teesside Ltd
Greenergy Fuels Ltd	Shell UK Ltd
Harvest Energy Ltd	Topaz Energy Ltd
Lissan Coal Company Ltd	Total UK Ltd

Table 2.1: Obligated suppliers

We have developed an automated system that allows suppliers to trade certificates in an easy and secure manner. We believe our trading system is robust and effective.

Revoked certificates and fraud

There were only three instances of certificates being revoked during the 2008/09 obligation year. All three instances were input errors by the suppliers themselves and there was no perceived intention on the part of the suppliers involved to attempt to defraud the system. Two of the three instances were identified by RFA staff, with the third being identified by the company before the RFA's systems had alerted RFA staff. The certificates were revoked with the full co-operation of the suppliers. Additional systems have been put in place to stop certificates being issued in similar circumstances in the future. Revoked certificates accounted for 0.06% of the total number of certificates awarded.

Certificates awarded	1,256,409,774
Certificates revoked	692,324

Table 2.2: Certificates awarded and revoked

A number of visits were carried out to registered suppliers to review typical recording systems for C&S data. All firms involved co-operated fully and this allowed RFA staff to enhance their understanding of some of the issues regarding the evidence for sources and composition of feedstocks and biofuel.

Year one certificate trading

The first RTFCs for the 2008/09 period were issued in July 2008. From this point up to 14 October 2009 (the end of the sixth RTFO quarter), there had been 96 trades of certificates from the 2008/09 obligation year. In the seventh RTFO quarter there continues to be an active market in the trading of certificates for the first obligation year. These certificates can be used to meet up to 25% of any company's obligation in 2009/10. Both auctioneers and brokers have become involved in the trading of certificates.

Twenty four companies were involved in trading certificates (20 transferring in, 17 transferring out). This included 11 of the 14 obligated suppliers, 12 of 82 other fuel suppliers and one of three traders. This is less than a third of the companies registered on the RFA system. A few companies dominated the trading: 60% of trades involved one of three suppliers.

Size of RTFC trades

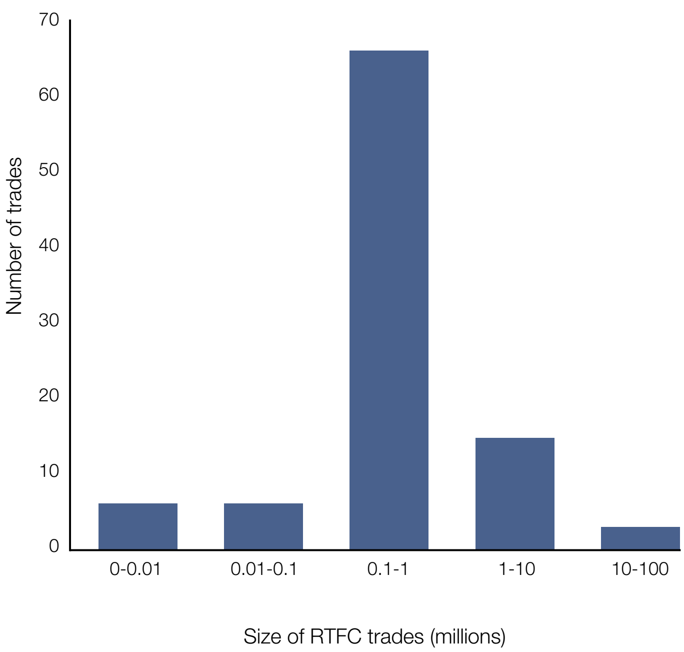


Figure 2.5: Size of RTFC trades

The majority of individual trades involved between 100,000 and 1,000,000 certificates. There were a small number of

1 Those companies supplying over 450,000 litres of relevant hydrocarbon oil into the UK.

smaller trades, and a few very large trades – the largest being for 60 million certificates. The scarcity of smaller trades indicates that most of the biofuel-only suppliers did not access the 2008/09 certificate market, and therefore did not, to October 2009, realise any financial benefit from reporting under the RTFO.

RTFCs traded

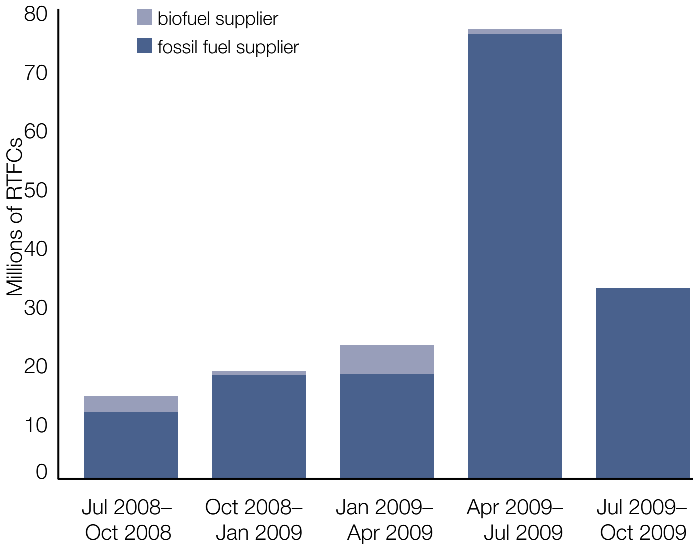


Figure 2.6: RTFC trades

The majority of trading, about 155 out of 164 million traded certificates, occurred between fossil fuel suppliers. Biofuel suppliers were able to trade away just over 9 million certificates, mostly to fossil fuel suppliers. Companies that have opened accounts solely to trade certificates had no significant involvement in the market, however we believe that brokers have been active in the market.

The market in RTFCs has grown since the start of the obligation, peaking in the first quarter of the second year. The quantity traded in this quarter was boosted by a single transfer of 60 million certificates.

While the discrepancy in the RTFO may have affected certificate value, it did not prevent trades from taking place. However, most of this trading appears to have been between larger suppliers and anecdotal evidence indicates that this may have been the result of pre-existing contracts.

Overall, the trading system is working as a mechanism to give obligated suppliers flexibility in meeting their obligations. A substantial number of certificates were traded between fossil fuel suppliers, and at the end of the first year all obligated suppliers were able to meet their obligation with certificates. Without trading this would not have been possible.

The trading system has not yet, however, demonstrated itself as a support mechanism for biofuel-only suppliers. Most biofuel-only suppliers have not sold certificates. This may be linked to the lack of market stability and reportedly low certificate value in 2008/09. As the RTFO becomes the prime support mechanism from the UK Government for biofuel production from April 2010, the viability of biofuel supplier business models is likely to be partly dependent on them being able to access the certificate market in future.

Supplier performance

Companies supplying biofuels under the RTFO

Fifty three suppliers of biofuels for road transport reported to the RFA under the RTFO in 2008/09. Of these, 38 supplied biofuels only; 15 also supplied fossil fuel, 14 of which were obligated. 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 30 for more details).

Targets

The Government has set 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 the Government expects 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 available. The Government has said that the targets will be subject to review in the light of suppliers' performance and other developments.

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%

Table 2.3: Government targets for supplier C&S performance

Fossil fuel company performance

Number of targets met

ConocoPhillips, Greenergy and Mabanaft, based on their verified data, met all three of the Government's targets. Lissan[1] met all three targets but as a low volume supplier of biofuels was not required to verify.

Morgan Stanley and Topaz[2] failed to meet any of the targets. Prax[2], BP[3] and Murco[3] reported meeting one or more targets, but did not achieve limited assurance.

Number of targets met		Fossil fuel company
3		ConocoPhillips
		Greenergy
		Lissan[a]
		Mabanaft
2		Esso
		Harvest
		Petroplus
		Shell
1		Chevron
		Total
0		Morgan Stanley
No limited assurance. Targets claimed:	3	Prax
	2	BP[b]
	1	Murco
	0	Topaz

a Lissan, as a low volume supplier of biofuels, were not required to verify their data

b BP submitted a revised Annual Report after the deadline in which some of their data was verified

Table 2.4: Number of targets met by each fossil fuel company

Greenhouse gas savings

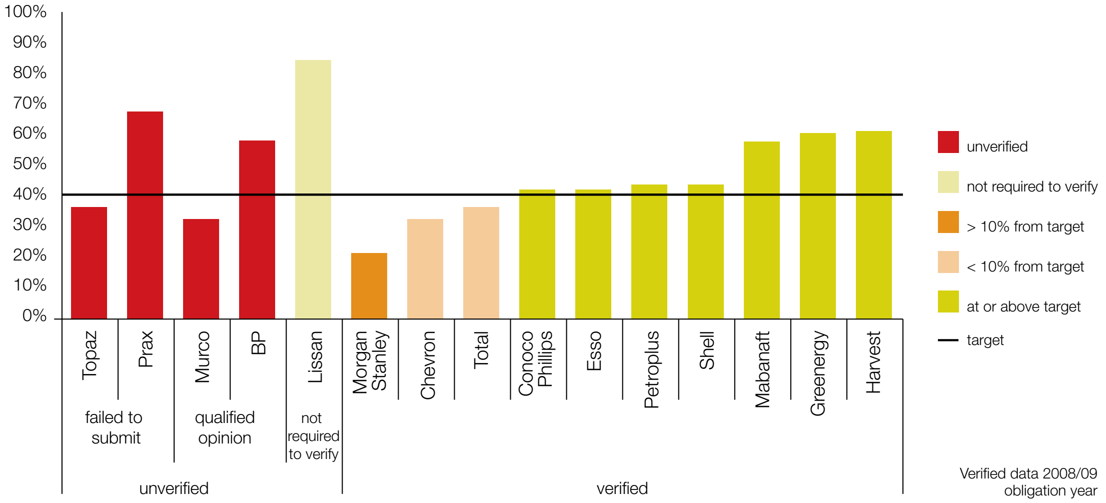
Eight of the 15 fossil fuel suppliers we report on met the Government's carbon savings target of 40% for 2008/09; a further four were within 10% of achieving the target.

1 Unverified: companies supplying less than 450,000 litres of biofuel per annum are exempt from the verification process.

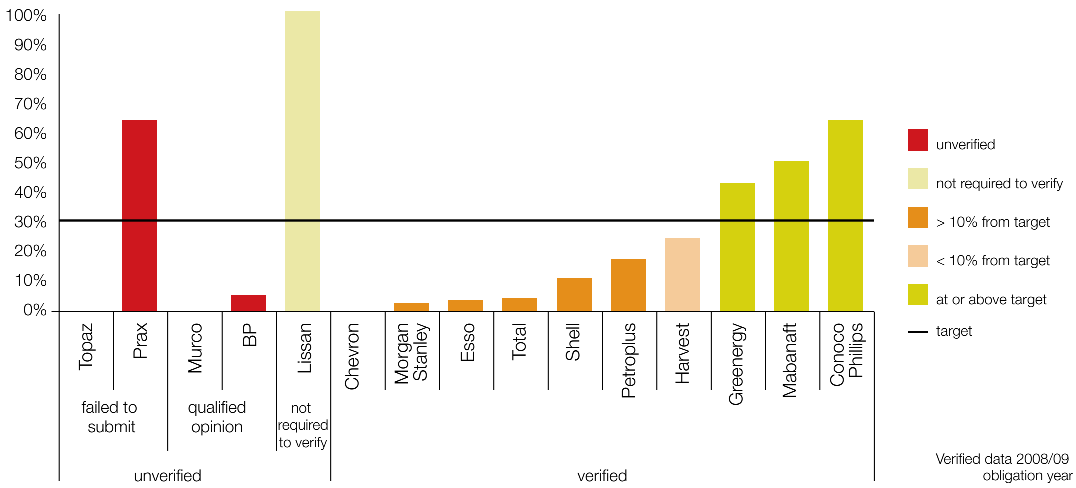
2 Unverified: Double Green, Ebony Solutions, V-Fuels Biodiesel and Prax failed to supply an Annual Report and verifier's opinion by the deadline. Topaz supplied an Annual Report without a verifier's opinion after the deadline. V-Fuels Biodiesel has gone into administration.

3 Unverified: BP and Murco supplied an Annual Report and a verifier's qualified opinion, which did not meet the RFA's verification requirements of limited assurance. A late revised report from BP provided limited assurance for a portion of their data.

Greenhouse gas savings



Environmental standard



Data capture

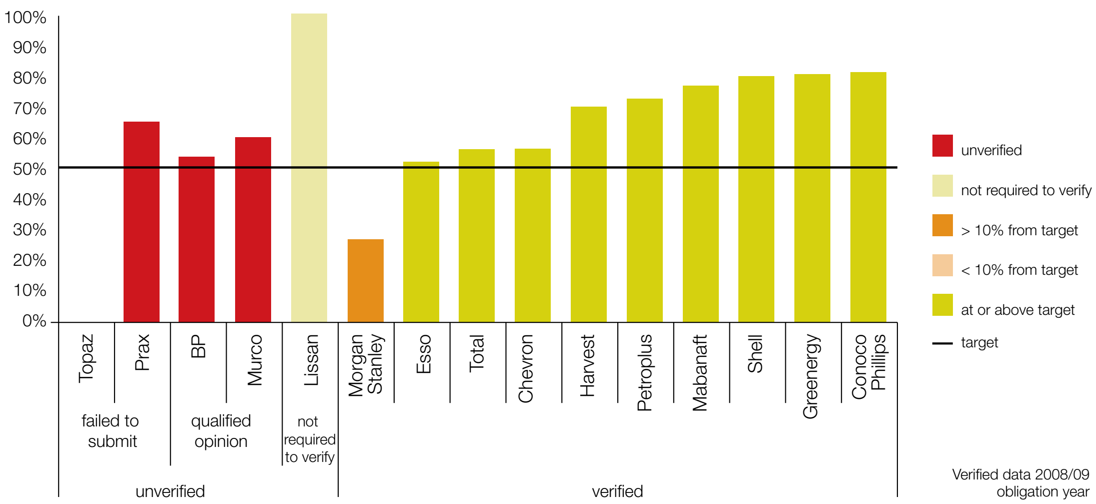


Figure 2.7 a,b,c: Fossil fuel supplier performance against the Government's targets

	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/ none/ unknown			
Fossil fuel suppliers	**BP**	27%	0%	6%	94%	0%	6%	94%	58%	1.8	54%
	Chevron	55%	0%	0%	100%	0%	0%	100%	33%	1.7	57%
	ConocoPhillips	50%	64%	0%	36%	0%	0%	100%	42%	4.1	81%
	Esso	6%	3%	0%	97%	0%	0%	100%	43%	1.9	53%
	Greenergy	78%	16%	27%	57%	18%	29%	53%	61%	3.4	81%
	Harvest	58%	12%	13%	76%	0%	13%	87%	62%	2.3	70%
	Lissan	100%	0%	100%	0%	0%	100%	0%	85%	2.4	100%
	Mabanaft	76%	24%	26%	50%	0%	26%	74%	57%	2.3	77%
	Morgan Stanley	3%	0%	3%	97%	0%	3%	97%	21%	1.0	27%
	Murco	66%	0%	0%	100%	0%	0%	100%	33%	1.8	60%
	Petroplus	81%	0%	18%	82%	0%	18%	82%	43%	2.6	72%
	Prax	64%	0%	64%	36%	0%	64%	36%	68%	1.8	65%
	Shell	67%	0%	11%	89%	0%	11%	89%	45%	1.9	79%
	Topaz	0%	0%	0%	100%	0%	0%	100%	36%	0.0	0%
	Total	58%	2%	3%	95%	0%	3%	97%	36%	2.2	56%

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

Table 2.5: Fossil fuel supplier performance

Two suppliers reported that they met the target, but their data was not verified. Morgan Stanley was the poorest performer, with verified information, achieving just 21% GHG savings relative to fossil fuel compared to an overall average for the RTFO of 46% (Fig. 2.7a).

A number of suppliers collected actual fuel chain data to calculate their GHG emissions. Two thirds of ConocoPhillips' biofuel, 14% of Lissan's, and less than 5% of Greenergy's, Harvest's, Petroplus' and Total's biofuels were reported using actual data for the GHG calculation.

Environmental sustainability

Only four suppliers – ConocoPhillips, Greenergy, Mabanaft and Lissan[1] met the environmental sustainability target of 30%. Prax[2] reported that they met the target, but their data was not verified. Several suppliers (Chevron, Murco[3], and Topaz[2]) did not report any biofuels meeting the qualifying environmental standard; Morgan Stanley, Esso and Total reported less than 5% of their biofuels as meeting a qualifying environmental standard (Fig. 2.7b). This compares to an aggregate overall performance of 20%.

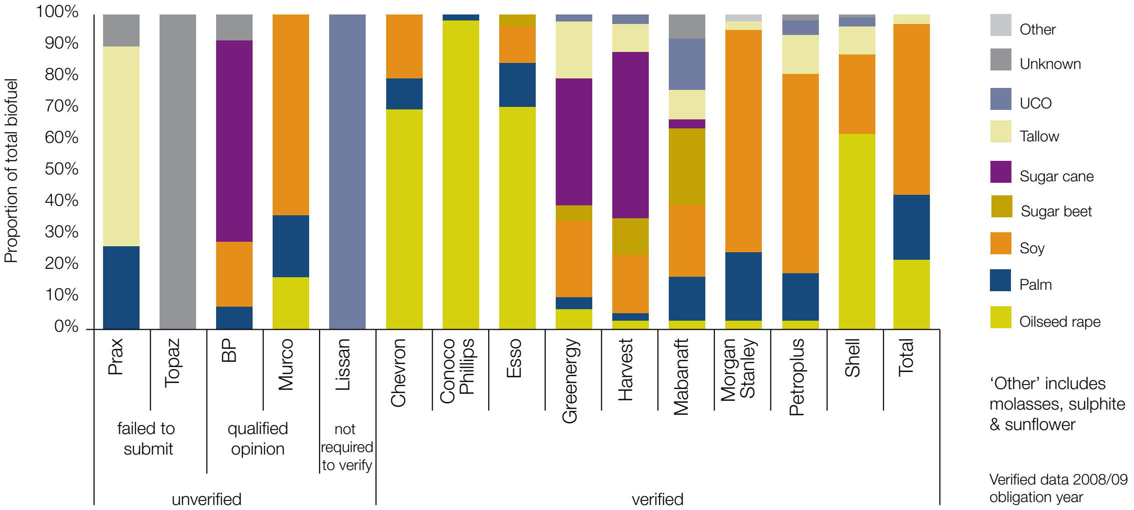
Data capture

Just two suppliers failed to meet the 50% data capture target – Morgan Stanley (27%) and Topaz[2] who failed to supply any C&S data. This compares to an aggregate overall performance of 64%. (Fig. 2.7c).

Where did the fossil fuel suppliers source their biofuels from?

Fossil fuel suppliers sourced their biofuels from at least ten different feedstocks and 18 countries, of which seven feedstocks and nine countries dominated the mix (Figs. 2.8a,b). Oilseed rape was the main biofuel feedstock for Chevron, ConocoPhillips, Esso and Shell – sourced primarily from Europe. Morgan Stanley, Murco[3], Petroplus and Total sourced primarily from US soy. BP[3], Greenergy and Harvest

Suppliers' biofuel mix by feedstock



Suppliers' biofuel mix by country of origin

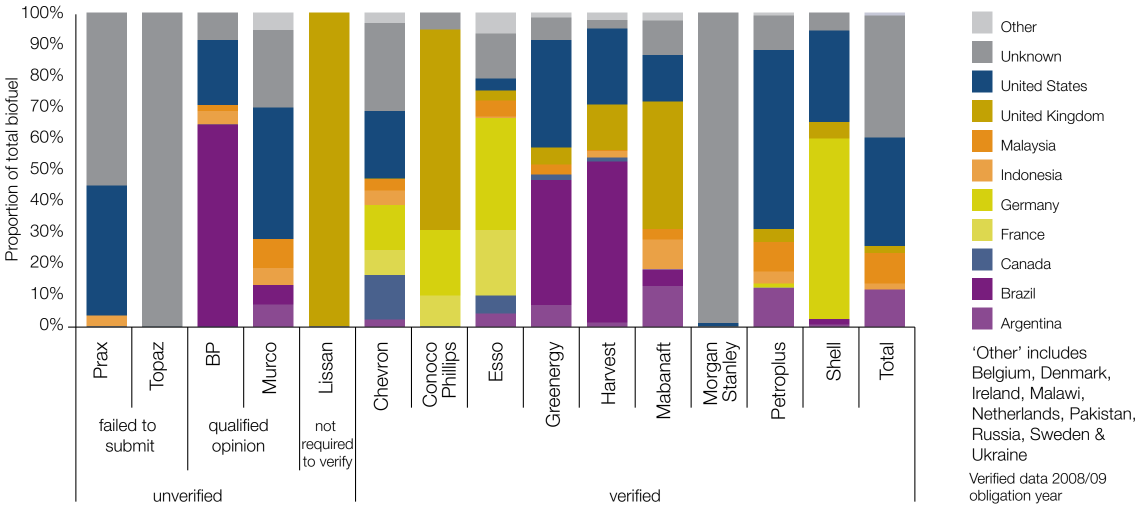


Figure 2.8 a,b: Biofuel feedstock and country of origin by fossil fuel supplier

used significant volumes of Brazilian sugar cane reflecting the fact bioethanol makes up a significant proportion of their biofuel, whilst Mabanaft used UK sugar beet as their main bioethanol feedstock. Lissan[1] and Prax[2] primarily used the by-products UCO and tallow, respectively.

A number of suppliers sourced from two feedstocks with higher GHG emissions than the fossil fuel they replaced: oilseed rape from the USA and Pakistani sugar cane have emissions 8% and 36% higher than diesel and petrol, respectively. These made a small proportion (0.4 to 1.4%) of the biofuel supplied by Greenergy, Harvest, Mabanaft and Petroplus; however, 9% of Chevron's biofuel was sourced from US oilseed rape.

All bar three companies (Lissan, Shell and Topaz) supplied biodiesel from palm oil. Disappointingly, only 0.5% of this was RSPO-certified palm. Other non-UK feedstocks do not have well established operational sustainability standards; although it is possible for suppliers to conduct their own independent field audits against the RTFO Meta-Standard. Greenergy are the only company to utilise this approach in the first year of the RTFO, through the application of the RTFO Meta-Standard to Brazilian sugar cane. An additional 17% and 27% of their total biofuel met at least the Qualifying Environmental Level and Social Level, respectively, as a result of these independent audits.

No suppliers reported any land-use change associated with the biofuel feedstocks they sourced; however, all suppliers reporting fuel from agricultural feedstocks reported that they did not know the previous land-use for a portion of their biofuel (Table 2.5). Notably the land-use was not known for over 90% of Esso's, Morgan Stanley's, and Topaz's[2] biofuel, and 73% of BP's[3]. 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.

	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/ none/ unknown			
Biofuel suppliers	MPB Bioproducts	100%	100%	0%	0%	0%	0%	100%	36%	2.0	100%
	Muirhouse Farm	100%	100%	0%	0%	0%	0%	100%	36%	2.0	100%
	Pure Energy Fuels	43%	0%	25%	75%	0%	25%	75%	45%	2.2	67%
	Regenatec	0%	0%	0%	100%	0%	0%	100%	10%	2.0	50%
	Verdant	100%	70%	0%	30%	0%	0%	100%	67%	5.0	93%
	V-Fuels Biodiesel	72%	2%	71%	28%	0%	71%	29%	63%	3.2	79%

a the only known land uses reported were ‘by-product’ and ‘cropland

Table 2.6: Biofuel supplier performance

Supplier	Greenhouse gas saving	Accuracy level, (0-5)	Supplier	Greenhouse gas saving	Accuracy level, (0-5)
ABAKO	85%	2.5	Green Fuels	84%	2.0
Argent Energy	85%	5.0	GreenerDiesel.com	85%	2.0
Associated British Bio-Fuels	85%	3.0	GreenFuel Supply Solutions	63%	3.0
Biesel	85%	2.0	Kassero Edible Oils	85%	2.0
Bio UK Fuels (Sheffield)	85%	2.0	Longma Clean Energy	85%	2.0
Biofuel Refineries	86%	5.0	MFS Fuel Supplies	85%	2.0
Biomotive Fuels	85%	2.0	Ozone Friendly Fuels	85%	2.6
Celtic Biodiesel	85%	2.0	Pilkington Oils	85%	3.0
Convert2Green	85%	2.0	PRS Environmental	85%	2.0
Devon Biofuels	85%	2.0	Pure Fuels	85%	2.0
Doncaster Bio Fuels	85%	2.0	Refuel Energy	85%	2.0
Double Green	85%	4.3	Rix Biodiesel	85%	2.0
Ebony Solutions	85%	2.4	Shepherds Bakery	85%	2.0
Edible Oil Direct	85%	2.0	Uptown Oil	85%	2.5
Gasrec	69%	5.0	Veg Oil Motoring	99%	2.0
Goldenfuels	85%	2.0	Wight Made Diesel	85%	2.0

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

Table 2.7: Performance of biofuel-only suppliers using only by-products as feedstock

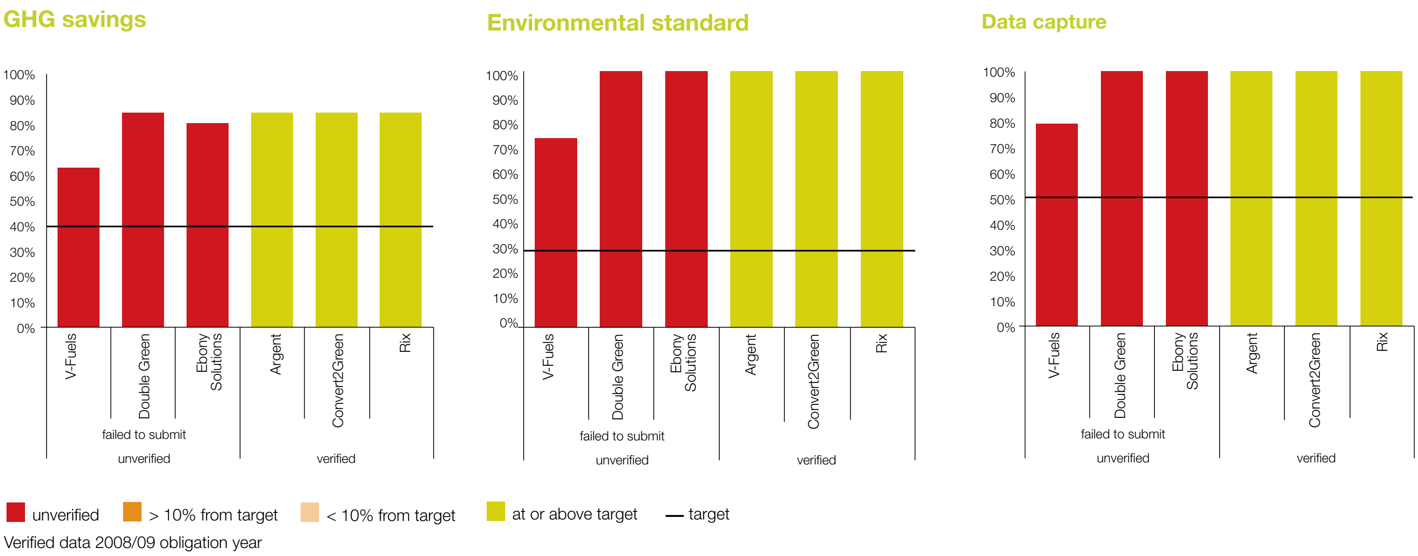


Figure 2.9 a,b,c: Biofuel supplier performance against the Government targets

Biofuel supplier performance

Targets met

The majority (89%) of the biofuel-only suppliers were reported as meeting all three of the Government targets, with all suppliers meeting the data capture target (Table 2.6, 2.7). Of the six suppliers that were required to supply a verified Annual Report[4] to the RFA, three failed to do so – Double Green[2], Ebony Solutions[2] and V-Fuels[2]. Argent, Convert2Green and Rix submitted a verified Annual Report as required. All six of these suppliers met the Government's targets (Figs. 2.9a,b,c).

Four biofuel-only suppliers failed to meet the GHG savings target and/or the percentage of environmentally sustainable fuel target. Muirhouse Farm Partnership[1] and MPB Bioproducts[1] sourced UK oilseed rape for their biodiesel and reported using the RFA GHG default saving of 36%, thereby falling short of the 40% GHG savings target. All of this fuel met the RTFO Environmental Meta-Standard. Pure Energy[1] and Regenatec[1] sourced US and Brazilian soy (for which there is currently no operational sustainability standard) thereby failing to meet the target for percentage of fuel meeting a qualifying environmental standard. Regenatec additionally failed to meet the GHG savings target.

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

Thirty two of the 38 biofuel-only companies supplied only or mostly used cooking oil (UCO), which made up 85% of the biofuel supplied by these suppliers (Table 2.8). UCO is classified as a by-product and therefore automatically meets the Qualifying Standard Level for sustainability, as well as not causing direct or indirect land-use change. UCO additionally delivers high GHG savings.

Argent, Biofuel Refineries[1], Gasrec[1] and Verdant[1] reported GHG savings using actual fuel chain data for all of their biofuels. Double Green[2] used actual data for 76% of their fuel; no other suppliers reported actual fuel chain data.

4 Suppliers of over 450,000 litres of biofuel per year are required to submit an Annual Report and verifier's opinion to the RFA.

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 one, published on the RFA website.

Fuel type	Feedstock	Country	Proportion
Biodiesel	Oilseed rape	Ireland	1%
		United Kingdom	2%
	Soy	Brazil	0.2%
		United States	0.4%
		Unknown	9%
	Tallow	United Kingdom	0.2%
		United States	0.1%
	UCO	Ireland	0.3%
		United Kingdom	85%
Bioethanol	Cheese (by-product)	Ireland	0.01%
Biogas	MSW	United Kingdom	2%

Table 2.8: Biofuel-only suppliers' biofuel mix

Supplier sustainability work

Suppliers claiming over 450,000 RTFCs per annum must include in their carbon and sustainability Annual Reports an overview of their additional sustainability activities. The 2008/09 reports, available from our website, were required to include the following items, where information was available.

Fuel supplier information:

- activities to improve the proportion of sustainably sourced feedstock and reduce average carbon intensity;
- activities to support development of sustainability standards;
- activities to promote feedstock production on idle land, and volume of such feedstock sourced;
- activities to improve the accuracy of carbon data being used (defaults vs actual data);
- environmental management system certificates;
- successful prosecutions for breaches of compliance with any environmental or social regulations related to biofuels activities;
- existing verified environmental or corporate responsibility reports.

Information on other parties within the supply chain:

- the percentage of their supply chain partner's total feedstock which meets respected sustainability standards;
- environmental management system certificates held, e.g. ISO 14001;
- successful prosecutions for breaches of compliance with any environmental and/or social regulations related to biofuels activities.

Overall, the supplier reports do provide evidence of some engagement by the industry on sustainability. However, whilst some suppliers have been undertaking substantial activities to improve the sustainability of their biofuel, others did not demonstrate significant engagement.

In general, the commentary on sustainability activities provided by suppliers was poor, and in no case did a company report in detail all the information required by the RFA. For instance, no company except Shell reported any activity to promote feedstock production on idle land. Several suppliers provided little or no information in their submitted reports regarding relevant activities, or did not demonstrate a commitment to act on sustainability issues. We would hope to see significantly more detailed reporting on supplier's sustainability activities in their 2009/10 reports.

Some suppliers have introduced and implemented internal sustainability policies to apply when sourcing biofuels. These policies include criteria such as asking suppliers for assurance that production is not taking place in areas of high biodiversity or that child and forced labour is not being used on plantations.

Various companies participate in initiatives like the Round Table on Responsible Soy (RTRS) or the Roundtable on Sustainable Biofuels (RSB) (see *Development of sustainability standards*, page 67), which aim to increase the supply and availability of certified sustainable biofuel feedstocks and provide internationally agreed frameworks for production.

Roundtables

There are several global organisations that bring together key stakeholders on both the production and purchasing sides of given commodity supply chains, e.g. producers, traders, governmental representatives, NGOs, academics and consultancies. These schemes aim to agree voluntary production standards that improve environmental and social outcomes of crop cultivation and processing. Roundtables may evolve to offer certification and chain of custody systems, once the underlying standards are agreed.

Being a member of a roundtable does not necessarily imply that a supplier's feedstock has achieved certification under that scheme. Similarly, a supply chain partner could be a member of such a scheme, or even have achieved certification for part of its production, without certified feedstock having actually been purchased by the supplier in question.

The four most prominent bodies are the Roundtable on Sustainable Palm Oil (RSPO), Round Table on Responsible Soy (RTRS), Better Sugarcane Initiative (BSI) and Roundtable on Sustainable Biofuels (RSB).

Supplier-specific sustainability activities

The suppliers are listed below according to the number of sustainability targets they met.

Three targets met

Argent Energy produces biodiesel using only tallow and used cooking oil, therefore 100% of its fuel meets the Qualifying Sustainability Standard. It intends to continue using only these feedstocks in subsequent years. Argent plans to improve the accuracy of carbon data being reported by using actual emissions data for its biodiesel fueled trucks. Argent did not report on whether it, or any of its suppliers, had been prosecuted for breaches of environmental or social regulations.

‘Whilst some suppliers have been undertaking substantial activities to improve the sustainability of their biofuel, others did not demonstrate significant engagement’

ConocoPhillips provided details of principles underlying its environmental policy, but, in general, did not provide concrete examples of the application of these principles. It reported levels of investment in biofuels research, including advanced technologies. It reported the highest average accuracy level for its carbon data of any obligated company. Although it exceeded the target for fuel meeting an environmental standard, it is not a member of RSPO or other standards bodies. Its Humber refinery has an ISO 14001 certified environmental management system. It did not supply any sustainability information on supply chain partners.

Convert2Green uses only UK sourced used cooking oil as a biofuel feedstock, and hence considers its operation fully sustainable. The company was able to report 100% of its biofuels meeting the Environmental and Social Sustainability Qualifying Standard. It has made changes to its production facility and distribution fleet during the obligation period that the company believes will increase the GHG savings of the biodiesel produced; however, details of reduced emissions have not, to date, been reported to the RFA. Convert2Green confirmed that it had not been prosecuted for breach of any environmental or social regulations in this obligation period.

Greenergy is the only company in the first obligation period to have put in place a procedure to have its biofuel feedstocks audited against the RTFO Meta-Standard (see case study, page 29). It has undertaken a test case GHG analysis for one of its ethanol suppliers using real data (rather than relying on RFA defaults), which suggests improved GHG savings. It has used qualitative data from British Sugar to report a better than default saving for sugar beet ethanol. It has also aimed to increase GHG savings by maximising the use of wastes and by-products (37% of its biodiesel supply). Greenergy has begun a programme of work assessing GHG emissions from indirect land-use change. It is a member of four standards bodies (RSB, RSPO, RTRS, BSI). Greenergy was able to identify that at least 72% of its palm oil was produced on long term agricultural land, and is aiming to increase this to 100%. It is sourcing from a supplier working towards RSPO certification, but has not to date reported using any certified palm oil.

Mabanaft stated that although it has not reported any certified feedstock, several of its palm and soy suppliers are members of the RSPO and RTRS, respectively. It did not report that these suppliers have achieved certification to date. Mabanaft is not a member of any standards bodies. It met the Government’s environmental sustainability target through the supply of biodiesel from UCO and tallow. Mabanaft has taken advantage of short supply chains (sourcing from UK production) to collect actual GHG emissions data.

Rix sourced only UCO. It provided no information on additional sustainability activities.

Two targets met

Esso reported on investments in the development of advanced biofuels technologies. It provided information on several supply chain partners. One supplier has invested in data provision to meet RTFO requirements. Two are members of RSPO; of these two, one is also an RTRS member, and one has achieved RSPO certification for some of its palm oil. Work is underway with this last supplier to determine and report ‘actual’ GHG savings. Esso has not, however, reported the use of RSPO certified feedstock and is not itself a member of any standard body. Esso has a policy of reporting conservatively through the year, and was able to demonstrate small improvements in its sustainability data after verification. Esso has an ISO 14001 certified environmental management system.

Harvest Energy is a member of the RSPO and has made term agreements for the future supply of RSPO verified material, though it has not reported any RSPO certified fuel to date. It is asking suppliers to join environmental schemes. It has sourced all of its sugar beet and over 10% of its oilseed rape from ACCS certified material. Harvest has used wastes and by-products as feedstock for 35% of its biodiesel. It achieved the highest GHG saving of any obligated company that submitted a verified Annual Report. Harvest has started to receive actual data from suppliers, and aims to increase use of ‘accuracy level 3 and 4’ (see *Effects of the RTFO on greenhouse gas emissions*, page 37) data in RTFO year two.

Petroplus has improved its data reporting over the year through contact with its suppliers. Through the Northeast Biofuels ‘Grower Network’ it is involved in improving the carbon and sustainability of feedstocks grown in North East England. Although the majority of Petroplus’ biofuel comes from soy and palm, it is not currently a member of RSPO or RTRS, stating that it is not yet convinced of the robustness of these mechanisms. Petroplus has developed a purchasing specification that includes demands on supplier supply chain monitoring. It did not provide information on supply chain partners or activity to improve carbon savings.

Shell has a sustainable sourcing policy for suppliers, containing sustainability clauses for new and renewed term contracts. This demands assurance that high biodiversity areas have not been damaged, and that forced and child labour have not been used. Suppliers are also asked to join relevant standards bodies; however, to date, Shell has not reported any biofuel certified to a qualifying standard. Shell is a member of the RSB, RSPO, RTRS and BSI. It has planned independent audits of oilseed rape grown in Germany against the RTFO Meta-Standard. Further work includes research and development as well as involvement in a consortium focusing on identifying 'Responsible Cultivation Areas' (appropriate idle land) for future biofuels expansion. Shell did not report any activities to improve its carbon savings.

One target met

Chevron states that it is working through the International Petroleum Industry Environmental Conservation Association (IPIECA) to engage with the RSB and the European Petroleum Industry Association (EUROPIA), with the aim of improving chain of custody for certified sustainable crops. It is not a member of any standards bodies itself. Although Chevron reports that it asks its suppliers to source only sustainable palm oil, the company is not able to provide evidence through its chain of custody to demonstrate RSPO, or other, certified supply. Internationally, Chevron is involved in advanced biofuels research, including projects working on non-food cellulosic feedstocks.

Total operates an ISO 14001 certified environmental management system. It provided no significant information on activities to support biofuel sustainability.

No targets met

Morgan Stanley (on whose behalf Ineos Refining reported) has developed a company sustainability standard for its suppliers. This demands that suppliers provide proof of country of origin, make assurance of no damage to high conservation value areas after 2005, no use of child labour, and no use of forced labour. It demands RSPO membership and evidence of progress towards full accreditation from palm suppliers as well as evidence of membership or application to join the RTRS from soy suppliers. However, Morgan Stanley is not a member of any standards bodies, nor has it reported any certified fuel. Verification revealed insufficient evidence to substantiate most sustainability information provided by suppliers to Morgan Stanley in year one. It intends to undertake an early verification of the first three months data from year two and work to improve supplier performance. It has an ISO 14001 certified environmental management system.

Unverified

BP[1] highlighted that its biofuels business is investing in development and commercialisation of advanced biofuel technologies. BP companies are members of the following sustainability assurance schemes: RTRS, RSPO, BSI and RSB. BP are also involved in a joint venture to build a wheat ethanol plant in the North East of England. BP did not supply any sustainability information on its supply chain partners.

Murco reported purchasing from RSPO and RTRS members where possible. It provided no information on what percentage of fuel this represented, or any progress by these suppliers towards certification. They did not report certified biofuel in their report to the RFA. Some suppliers have reported that their South East Asian and South American supply chains are certified to ISO 14001. Murco does not have a certified environmental management system. Murco did not provide details on any specific activities to improve carbon and sustainability performance.

Topaz' Annual Report was received after the deadline, and even then contained no verifier's statement. It supplied no information on activities to support biofuel sustainability. It has committed to improve its reporting in the second reporting year.

Who failed to report?

A number of suppliers failed to submit an Annual Report and verification statement for 2008/09:

- Double Green
- Ebony Solutions
- Prax
- Topaz[a]
- V-Fuels Biodiesel[b]

The RFA currently has no powers to take action against such failures. Verification is a requirement of the forthcoming Renewable Energy Directive 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.

a Topaz provided a report but failed to submit a verifier's opinion.
b V-Fuels Biodiesel went into administration.

1 BP supplied an Annual Report and a verifier's qualified opinion, which did not meet the RFA's verification requirements for limited assurance. A late revised report from BP provided limited assurance for a portion of their data.

Case studies

These three case studies reflect positive examples of companies supplying more sustainable biofuels in 2008/09:

Biogas

Gasrec supplies biomethane fuel under the RTFO. Biomethane produced by anaerobic digestion of organic landfill waste or manure is a good example of a sustainable biofuel. No land is required and the work presented later in this report (*Indirect effects of using wastes, residues and by-products*, page 59) identifies avoided emissions, giving biomethane from MSW a net carbon saving of over 100%.

Pure plant oil

Several relatively small biofuel companies supply pure plant oil (PPO) for converted vehicles. PPO does not need the additional processing step of transesterification, which is needed to produce biodiesel. This allows oilseed rape PPO to deliver a higher carbon saving than oilseed rape biodiesel, based on the RFA defaults. In Germany, several thousand heavy goods vehicles have been converted to operate on PPO. In the UK, usage is more limited, but converted vehicles are available. A technical fuel standard has been developed to ensure fuel quality.

RTFO Meta-Standard

In mid 2007, Greenergy began to develop criteria to apply the high-level principles of the RTFO Meta-Standard in a practical, locally appropriate, way to its purchases of bioethanol from Brazil. This approach, through independent field audit, was necessary as there is no standard currently in operation to demonstrate the sustainability of Brazilian bioethanol imports against the Meta-Standard. Greenergy's interpretation for Brazilian sugar cane was the first crop specific interpretation of the Meta-Standard to be approved by the RFA, and allows Greenergy to report sugar cane meeting the environmental and/or social criteria of the RTFO Qualifying Standard and Meta-Standard.

Conclusion

In general, suppliers are starting to rise to the challenge of tracing the sustainability of their fuels to meet their reporting obligations under the RTFO. Progress by feedstock standards such as the RSPO and BSI, and the involvement of suppliers in these initiatives, shows some reason for optimism. Initiatives such as Greenergy's and Shell's audits against the Meta-Standard have the capacity to positively affect agricultural practices. For instance, as a consequence of Greenergy's auditing a significant supply of sugar for consumption meets the Meta-Standard. Such initiatives could not exist without the RTFO reporting system.

However, other suppliers have failed to show a commitment, and provided disappointingly little information regarding significant and relevant sustainability activities. Suppliers were asked to report on initiatives to improve the sustainability of feedstocks, including membership of feedstock sustainability standards. Unfortunately, only a few have supported these standards through proactive membership.

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 (C&S) information submitted to the RFA must be demonstrated through independent verification. The verifier's report must be submitted to the RFA alongside each supplier's Annual Report. The RFA does not currently provide a list of 'approved verifiers', but verifiers must be qualified to carry out audits against the International Standard on Assurance Engagements (ISAE 3000), which defines the requirements for limited scope engagements.

Chain of Custody Level	Possible audit activities
Data collection and reporting	- Review of volume data - Review of records of C&S information - Review of mass balance system
Reporting party control environment	- Supplier pre-qualification and selection processes - Contractual information provision requirements - Supplier audit activities - Quality review and documentation management
Supply chain control environment	- Review of C&S records held by suppliers - Review of suppliers' data controls around the provision of C&S information - Review of compliance with contractual sustainability information provisions
Source of C&S information	- Review of C&S information collection processes - Physical inspection/interviews with producers and third parties

Figure 2.10: Potential assurance activities in the chain of custody

In addition to the guidance on verification available in the C&S Technical Guidance, the RFA engaged assurance experts Ernst & Young LLP in the summer of 2008 to produce detailed guidelines in response to requests for further clarification. These include issues such as the kind of evidence that should be obtained, potential assurance activities down the supply chain and testing procedures. One of the key principles of the RTFO system is that a verifier should be able to trace C&S claims back to the source of the data through the supply chain. 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.[1]

Context

The RTFO reporting system is a world first for biofuels and places new challenges on the nascent supply chain linking agricultural production with transport fuel supply for the first time since horse-drawn carriages. The expectation has always been that it will take time to develop operational procedures that will enable suppliers to track information about sustainability through their supply chains. Part of the rationale for starting with a reporting system under the RTFO was to enable time for such procedures to develop and mature before mandatory C&S performance requirements were introduced. Nevertheless, it can be seen from the results below that some suppliers have engaged far more proactively than others in equipping themselves to meet the new challenges.

Results

Suppliers were required to produce their Annual Reports with verification statements in respect of their data for the 2008/09 obligation period by 28 September 2009. The verification process, in many cases, resulted in changes to the first year's provisional dataset, reported in July 2009. This typically resulted from verifiers finding that insufficient evidence was available to support some of the claims that suppliers had made about their fuels.

RTFO aggregate results

At the aggregate level, the changes to performance from the provisional data set to the fully verified results against the Government's targets are detailed below. This indicates that the provisional results reported to the RFA during the year were broadly representative of actual performance.

A small portion of the data from which these results are derived was not verified (5.7% of total biofuel volume). This is due to five suppliers failing to supply a verified Annual Report and two suppliers being unable to provide limited assurance for their reports. In addition, companies supplying less than 450,000 litres per annum are not required to submit a verified Annual Report.

In calculating performance against the Government's targets, the C&S data of 5.4% of the total biofuel volume was changed

1 The RFA also accepts certain 'Book & Claim' chain of custody schemes as demonstration of compliance with sustainability criteria. In this case, a supplier can purchase a certificate such as GreenPalm RSPO independently of the feedstock itself and report the fuel as meeting the RSPO standard.

Annual supplier target	Target 08/09	Provisional	Verified
Percentage of feedstock meeting a qualifying environmental standard	30%	24%	20%
Annual GHG saving of fuel supplied	40%	47%	46%
Data reporting on renewable fuel characteristics	50%	69%	64%

Table 2.9: RTFO aggregate results

to 'unknown'. The C&S data of those suppliers who were not required to undergo verification has not been changed (0.3% of total biofuel).

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 24% to 20% - this was only two thirds of the Government's target.

Other notable changes to the verified dataset included 'unknown' previous land-use change rising from 36% to 42%, most of which was related to biodiesel feedstocks. Changes to the reported country of origin included France rising from 1 to 3%, USA reducing from 31% to 28%, and 'unknown' country of origin rising from 17% to 19% of biofuel.

Supplier results

Changes to data due to the verification process were not evenly distributed between the suppliers. The performance of most companies improved slightly or did not change as a consequence of the verification process. Notable changes were the removal of some of the claims for fuel meeting sustainability standards from ConocoPhillips and Morgan Stanley; and changes of data to 'unknown' by Morgan Stanley and Topaz (who supplied an Annual Report but no verifier's opinion). This significantly affected Morgan Stanley's GHG savings performance through reporting the more conservative RFA high-level carbon defaults (Figs. 2.11a,b,c). Consequently, Morgan Stanley dropped from meeting two of the Government's targets to none. The primary reason for the data changes appears to be related to parties further up the supply chain being unable to provide sufficient evidence to support the sustainability claims they had provided.

Number of targets met	Fossil fuel company	Verifier	Number of targets met (unverified 12 month report)	Change from unverified report
3	Conoco Phillips	Ernst & Young	3	–
	Greenergy	PWC	3	–
	Mabanaft	SGS	3	–
2	Esso	SGS	1	↑
	Harvest	SGS	2	–
	Petroplus	SGS	2	–
	Shell	Ernst & Young	2	–
1	Chevron	SGS	1	–
	Total	KPMG	1	–
0	Morgan Stanley[a]	Ernst & Young	2	↓
Unverified	Lissan	Not verified[b]	3	–
	Prax	Not verified[c]	3	–
	BP	Not assured[d] ERM	2	–
	Murco	Not assured[e] KPMG	1	–
	Topaz	Not verified[c]	1	↓

a In 2008/09 fuel previously reported in the name 'Ineos' was owned by Morgan Stanley at the duty point - making Morgan Stanley the legally obligated supplier, rather than Ineos itself. The RFA's monthly reports used the name 'Ineos' after consultation with the two suppliers.

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

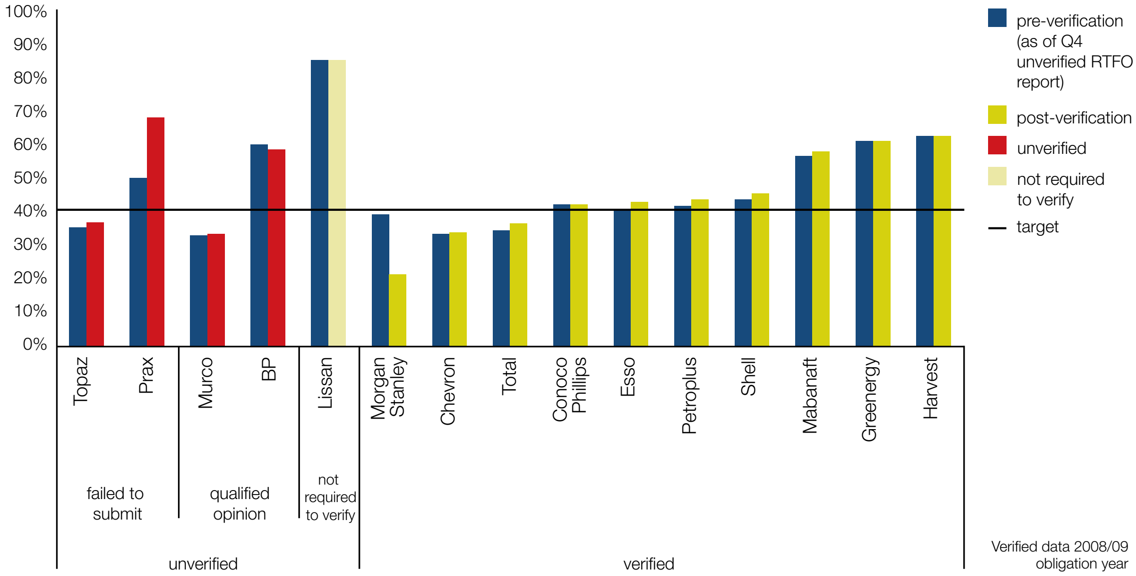
c Prax and Topaz failed to submit a verifier's opinion.

d BP supplied an Annual Report and a verifier's qualified opinion, which did not meet the RFA's verification requirement for limited assurance. A late revised report from BP provided limited assurance for a portion of their data.

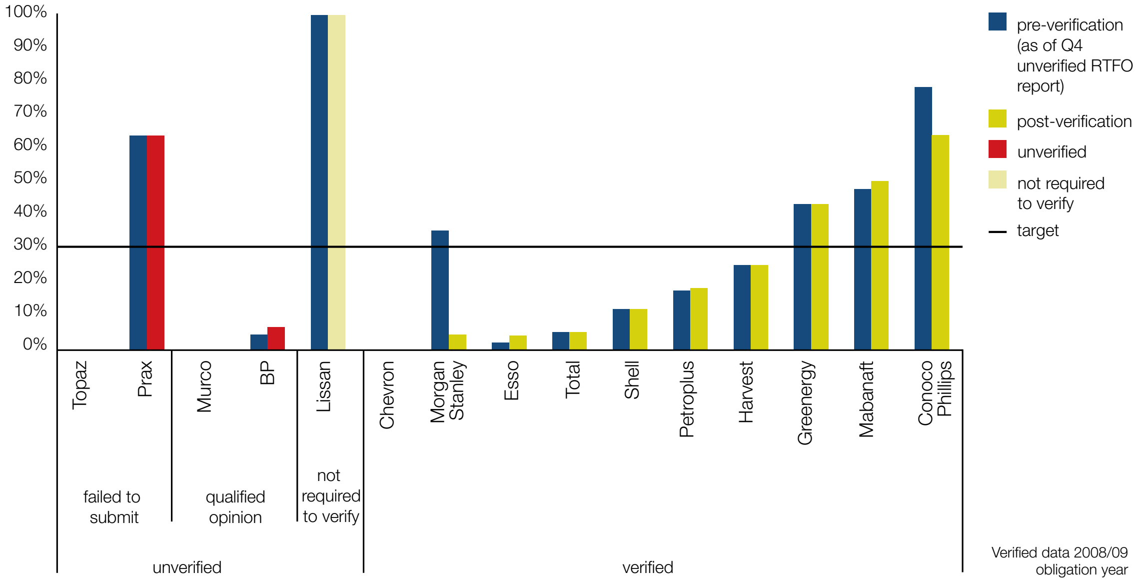
e Murco supplied an Annual Report and a verifier's qualified opinion, which did not meet the RFA's verification requirement for limited assurance.

Table 2.10: Effect of the verification process on supplier performance

GHG savings



Environmental standard



Data capture

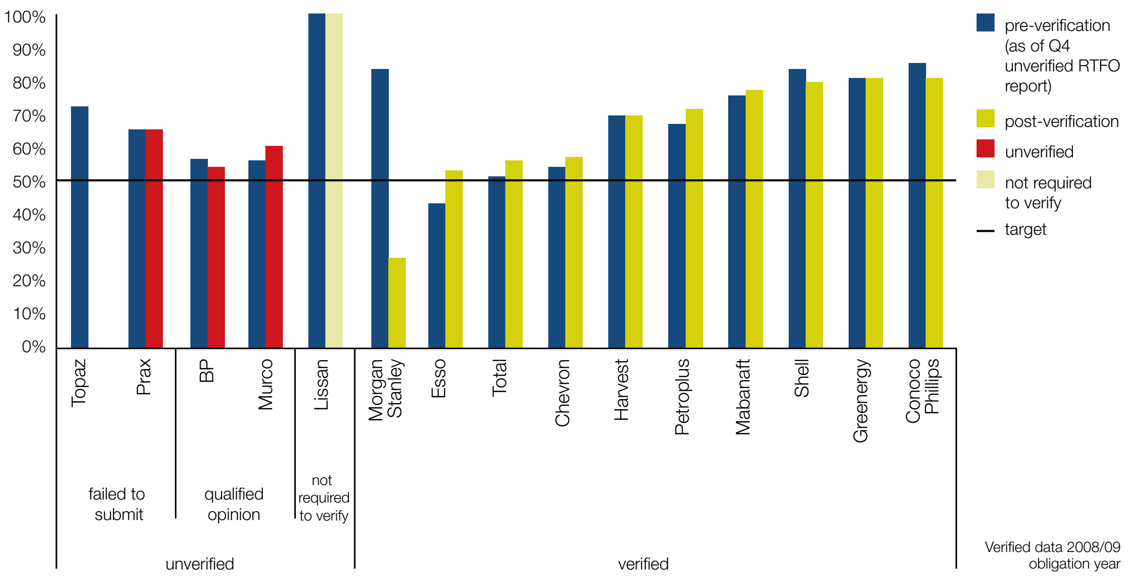


Figure 2.11 a,b,c: Fossil fuel supplier performance against the Government targets pre- and post-verification

‘In most cases, fuel suppliers have implemented adequate internal control procedures to track C&S characteristics within the company’

Although Morgan Stanley’s overall performance suffered as a result of the verification, it appears clear that a thorough audit was undertaken which should support improved procedures for information provision in the future.

The reports for BP and Murco came with ‘qualified statements’ from their verifiers. Although in each case the verifiers did not find evidence to contradict the information the company had provided, they found insufficient evidence further up the supply chains to substantiate the C&S claims. Following further discussions with BP’s verifier, limited assurance has been provided for one third of their C&S data.

Verifiers’ statements

‘Limited assurance’ audits aim to provide moderate assurance that the Annual C&S Report is without material mis-statement. As such verifiers need to state that nothing has come to their attention to indicate material mis-statement, given an appropriate level of investigation.

ISAE 3000 sets out the required content for assurance statements. These include:

- The **criteria** against which the subject matter was evaluated;
- A description of any inherent **limitations**, such as the extent of evidence gathering activities and where the work of third parties was relied upon;
- A description of the **assurance activities** the verifier performed;
- An **assurance conclusion** against the assurance criteria. The language used must be appropriate to either a limited or reasonable assurance engagement.

It is standard practice for the verifier to submit a report, in addition to the opinion, to the client, which typically includes observations on the overall effectiveness of the system in place to generate the C&S data as well as recommendations for improvement. The RFA wrote to verifiers in September 2009 to encourage the inclusion of observations from their work within their assurance statements for the RTFO reports, as a useful enhancement to the transparency of the RTFO reporting process.

The RFA critically evaluated the verification statements against the ISAE 3000 criteria and identified concerns about a significant number of assurance statements provided by suppliers. The RFA sought clarification on the statements from the companies’ verifiers. This resulted in some of the statements being revised to remove areas of ambiguity. Limited assurance was confirmed in most but not all cases. The majority of final assurance statements meet the ISAE 3000 criteria well.

In most cases it appears that fuel suppliers have implemented adequate internal control procedures to track C&S characteristics within the company. The major differences between the suppliers appeared to relate to the management and interaction with their supply chains and fuel purchasing policy. In some instances it was clear that reliance on the ‘spot-market’, as opposed to developing relationships with individual suppliers, inhibited a company’s ability to source fuels with known sustainability characteristics. A common feature of the verification statements was that companies needed to engage more closely with their supply chains, including the contractual elements, to improve their performance.

Conclusions and implications for mandatory requirements

Given that it was the first year of a new system, the verification process has gone relatively smoothly and better than many had anticipated. On the whole, verifiers appear to have fully understood the requirements of the scheme, and to have taken a consistent approach in conducting their audits.

Areas of clear inconsistency relate mainly to the treatment of data that could not be assured. In most cases, verifiers required that such data was ‘downgraded’ to ‘unknown’, which enabled a positive verification for the remaining data (though this had a profound effect on the final results of Morgan Stanley in particular). In the case of BP and Murco, such data were not downgraded, and consequently limited assurance could not be provided for the entire dataset.

Looking ahead, there are a number of issues with the current scheme that will need to be considered for the move to mandatory C&S requirements:

- Is the level of assurance appropriate?
- Is the timing of an end-of year verification process suitable?
- How can verification be extended to include small suppliers in the least burdensome way?

The RFA intends to hold discussions with verifiers and suppliers early in 2010 to discuss what can be learnt from the 2008/09 period. This could help inform the subsequent transition to mandatory requirements.

Effectiveness of carbon and sustainability reporting

Context

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

Better Regulation Executive study

To assess the effectiveness of the reporting requirements, and to consider lessons learnt for future policy, the Better Regulation Executive (BRE) carried out an in depth study with the support of the RFA.

Alongside desk research and an analysis of the RFA's quarterly reports (which detail progress towards the C&S targets), confidential interviews were carried out with a number of fossil fuel suppliers and other stakeholders.

Results

The study indicates that the reporting mechanism has had an effect on the behaviour of suppliers in terms of the collection of data regarding biofuel sustainability, but that it has been one of several factors having an influence on this. Reporting does appear to generate internal pressure within the industry to improve performance by facilitating comparisons between suppliers. Stakeholder interest in reporting, however, particularly from consumers, was not found to be sufficient to make them leverage their influence over suppliers. Other factors, in particular the future mandating of carbon and sustainability standards at UK and EU level as a result of the Renewable Energy and Fuel Quality Directives were found to be more dominant motivations for the apparent improvement in standards.

The study found that suppliers have a commercial interest in developing the biofuels aspect of their businesses, because they provide one means for them to meet the energy challenge whilst building upon their core hydrocarbon business. As such, there is strong enthusiasm in the sector for the long term potential of biofuels, as demonstrated by research and development investment in advanced biofuels technologies (which offer the prospect of improved environmental sustainability). Some suppliers consider that this is a driver of improved environmental performance quite independent of the reporting mechanism.

Considerable barriers to meeting the RTFO sustainability targets were highlighted by suppliers. These include the lack of certification schemes that meet RFA standards and the relative lack of power of the UK biofuels industry to influence behaviour in a diverse, global supply chain, particularly in the short time in which the RTFO has been in operation.

The study also highlighted the difficulties faced by a UK regulator in trying to influence behaviour in a global industry and a global supply chain. As multi-national companies, the oil majors in particular are under financial pressure to take advantage of economies of scale by supplying the same products in multiple markets across Europe. The introduction of EU-wide standards is therefore likely to have much more power to impact on behaviour down the biofuels supply chain. The anticipation of their introduction is already a major driver of change.

It is not clear to what extent the behaviour change inspired by the C&S reporting mechanism and forthcoming EU regulations has caused actual improvements in agricultural practices used in biofuel feedstock cultivation, as opposed to simply affecting data management processes used across the supply chain. For example, some suppliers and traders suggested that the use of certification schemes merely enabled them to prove that their product already meets the necessary standards. As a result, the study found a lack of evidence to demonstrate that this improvement in data collection translated into changes in agricultural practice that would improve the underlying sustainability of the biofuels.

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

Supplier reports

The reports from suppliers provide some evidence of changes in behaviour beyond data collection. For example, both the Harvest and Greenergy reports cite avoiding certain biofuels with poor GHG performance under the RTFO guidelines. Harvest also state that it is working with some of its supply streams to demonstrate agricultural and processing practices which improve GHG performance.

Two suppliers are implementing the RTFO Meta-Standard through auditing. Greenergy have conducted full audits at the plantation level and Shell is in the process of implementing a similar scheme. The Meta-Standard provides assurance that core sustainability principles including workers rights and biodiversity protection are adhered to. Such initiatives certainly have the capacity to affect agricultural practices on the ground and could not have happened in the absence of the RTFO reporting system.

Although improving data provision through the supply chain does not automatically result in improved sustainability

‘The reporting system provides a viable framework for mandatory performance requirements’

performance, it is a necessary first step if suppliers are to exert influence on their supply chains. A number of the reports demonstrate steps suppliers are taking in this area. The Shell report for example sets out a three pronged strategy for improving sustainable sourcing covering internal governance, engaging with suppliers and influencing the wider industry to raise sustainability standards across the feedstock industry.

Fossil Fuel Supplier	Sustainability standard			
	RSB[a]	RTRS	RSPO	BSI
BP[b]	✓	✓	✓	✓
Chevron				
ConocoPhillips				
Esso				
Greenergy	✓[c]	✓	✓	✓
Harvest			✓	
Lissan				
Mabanaft				
Morgan Stanley				
Murco				
Petroplus				
Prax				
Shell[d]	✓	✓	✓	✓
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 Greenergy has applied for membership, which is expected to be approved at the next Roundtable meeting.

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

Table 2.11: Fossil fuel supplier membership of standards bodies

Suppliers were asked to include information in their reports on initiatives to improve the sustainability of feedstocks, including membership of feedstock sustainability standards. Whilst some stated that they were considering joining, or encouraging their suppliers to, disappointingly few have supported these standards through membership thus far (Table 2.11).

It is also notable that only one of the fossil suppliers, BP, supplied any RSPO certified feedstock during the 2008/09 period despite certificates becoming available since the summer of 2008[1]. The surplus of RSPO certificates available would have been more than enough to cover all palm oil used for UK biodiesel in 2008/09. Ultimately the success of these schemes is contingent upon demand creating a premium for the end product on the market.

Conclusion

It is clearly difficult to identify and disentangle the effects of the RTFO reporting scheme on supplier behaviour from the various other drivers to improve C&S performance. There is good evidence, however, indicating that the nascent reporting system has made a positive contribution. Equally, it appears clear that reporting alone may be an insufficient measure to really transform the majority of the market, judging by the first year’s experience.

In recognition of the inherent limitations of reporting without minimum performance requirements, the other objective of the system was to provide a stepping stone to mandatory C&S requirements. This has clearly been met: whilst there have undoubtedly been challenges to overcome, the first year of reporting has demonstrated that suppliers can discriminate in their procurement policies; that they can track and trace C&S data through their supply chains; and that verifiers can substantiate this information. The reporting system has successfully demonstrated that it provides a viable framework for mandatory performance requirements. UK suppliers should therefore be relatively well positioned for the forthcoming RED implementation.

1 BP reported some RSPO-certified palm, though their report was not assured by their verifier by the deadline. A late verifier’s opinion provided limited assurance on the RSPO claim.

Section 3

Effects of the RTFO and the fuels supplied

Effects of the RTFO on greenhouse gas emissions

Carbon emissions

Carbon savings delivered by the RTFO

The main aim of the RTFO is to reduce carbon emissions from UK road transport. The RFA uses a lifecycle analysis (LCA) methodology that includes the carbon emissions from each step of the fuel chain. This also takes into account direct land-use change, where reported, although there is currently no carbon penalty for reporting 'unknown' previous land-use. It is therefore possible that not all direct land-use change emissions have been included. The lifecycle analysis does not include any indirect land-use change emissions, or other indirect emissions, which could be substantial (see box below).

In the first year of the RTFO, based on our methodology, net CO_2e savings of 1.6 million tonnes[1] were achieved by replacing 2.7% of road transport fuel with 1.3 billion litres of biofuels. So far, this is in line with the Department for Transport's anticipated carbon savings for the RTFO[2].

Indirect effects on carbon emissions

When undertaking a lifecycle analysis of the greenhouse gas emissions from any system, it is necessary to draw boundaries to define what will be included (Fig 3.1). The RFA methodology does not currently include any indirect greenhouse gas emissions that might be caused by biofuels. Emissions arising from indirect land-use change (as identified in the Gallagher Review), for instance where existing production of food is displaced by biofuels demand onto forest land, are not included. Neither are emissions that arise when the use of wastes or by-products for biofuels diverts them from an existing function. There is currently no agreed methodology for calculating these effects (see *Indirect effects of using wastes, residues and by-products*, page 59).

Where did the carbon savings come from?

The average carbon savings of all the biofuels combined was 46% relative to fossil fuel. This compares to a Government target for 40% carbon savings in 2008/09 and the Government's Regulatory Impact Assessment estimation of 50% saving by 2010[3,4].

Greenhouse gases – carbon, methane and nitrous oxide emissions

There are a number of greenhouse gases (GHGs) that contribute to climate change. Some, such as methane and nitrous oxide are generally emitted into the atmosphere in lower quantities than carbon dioxide (CO_2) but have a more potent warming effect. In order to make useful comparisons between fuel chains with different emissions of the various GHGs we refer to 'equivalent carbon dioxide emissions' or CO_2e, also referred to as 'carbon emissions'. Methane and nitrous oxide have a warming affect 27 and 296 times more potent than carbon dioxide, respectively. Nitrous oxide emissions due to the production and application of nitrogen fertiliser for feedstock cultivation form a substantial fraction of the 'CO_2e' emissions from many fuel chains (see *N_2O emissions from biofuel feedstock cultivation*, page 44).

At least 12 different feedstocks from at least 18 countries were used to deliver the carbon savings. The carbon savings can vary widely between feedstocks and the countries of origin, depending on the system of cultivation, the distance and type of transportation, and how the biofuel was processed. Ninety nine percent of the biofuels used in the UK under the RTFO delivered carbon savings; however, two feedstocks, oilseed rape from the USA and sugar cane from Pakistan, increased carbon emissions by 8% and 36%, relative to diesel and petrol[5] respectively.

Some feedstocks used under the RTFO made greater contributions to the overall carbon savings than others depending on both the volume used and the carbon saving of that feedstock (Fig. 3.1 and Fig 3.2). For example, UCO made up 3% of the volume but delivered 6% of the carbon savings due to its high carbon saving relative to other feedstocks. Conversely, soy, which has lower carbon savings, made up over a third of the total biofuel volume, but delivered less than a quarter of the overall carbon savings.

1 1.6 million tonnes of CO_2e is equivalent to 0.42 million tonnes of carbon.
2 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 would be equivalent to 0.7 to 0.8 million tonnes of carbon.
3 RTFO volume targets have since been revised downwards following the advice of the Gallagher Review and other evidence of the indirect effects of biofuels.
4 Regulatory Impact Assessment for the RTFO, DfT (2007).

5 Based on RFA defaults.

Proportion of biofuel by feedstock

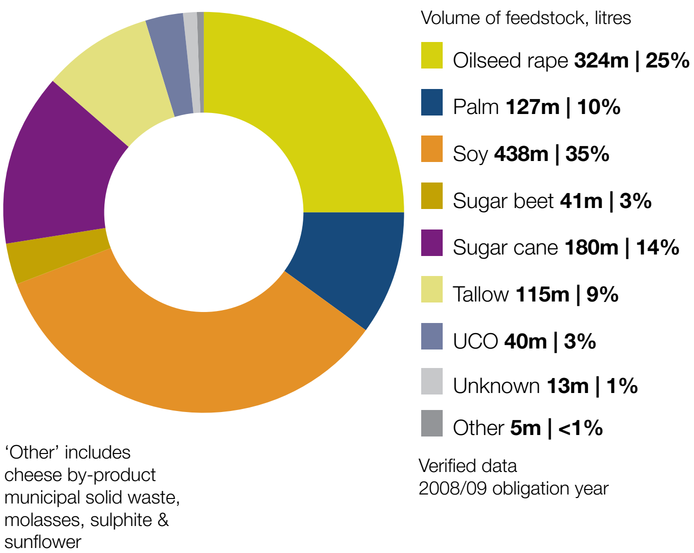


Figure 3.1: Biofuel by feedstock

Contribution of each feedstock to the overall carbon savings

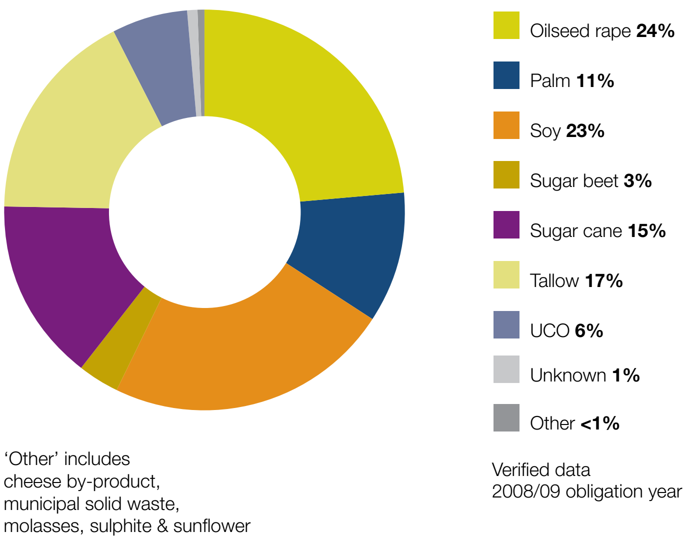


Figure 3.2: Contribution of feedstocks to carbon savings

Accuracy of the carbon saving results

The RFA's approach to setting fuel chain carbon defaults

The RFA set carbon emission defaults for over 200 fuel chains in the first year of the RTFO. The RFA defaults are set conservatively to encourage the supply of data (Fig 3.3). This means that fuel-level defaults (unknown feedstock and country) are generally more conservative than feedstock-level defaults (known feedstock, unknown country), and these are generally more conservative than feedstock/country-level defaults (known feedstock and country). Suppliers are able to edit the fuel chains and replace all, or part, of the chain with actual data from their supply chain where it is available. The RFA carbon defaults are also set to be more conservative than using actual data to calculate the fuel chain carbon emissions in most instances.

Carbon reporting using default values

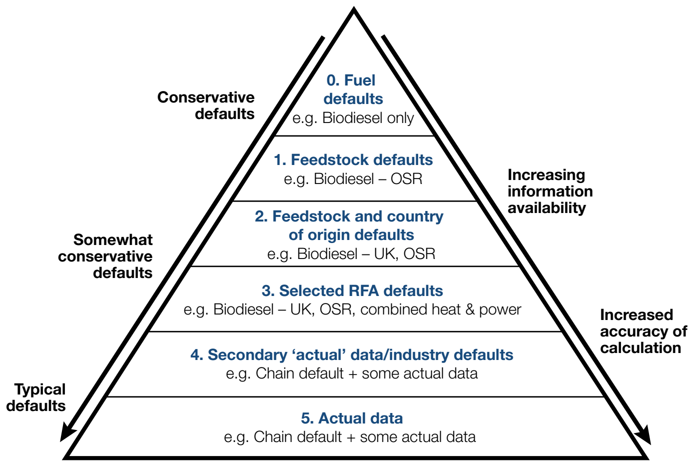


Figure 3.3: Carbon reporting using default values

Conservative versus typical carbon defaults within the RFA fuel chains

Within the RFA fuel chains there is a default carbon emission assigned to each step: all of the energy inputs and outputs of each stage in the chain are taken into account and converted to a carbon emission factor. For example, at the cultivation stage, the RFA has set defaults for the fertiliser and pesticide input, the crop yield, the fuel used on the farm, and nitrous oxide emissions from the soil. Some of these carbon defaults are based on typical emissions for that step in the biofuel process whilst others are set more conservatively.

Conservative default values within the fuel chain have been applied to activities that occur in the biofuel conversion phase or downstream, where it is likely that biofuel suppliers would have most influence over the type of practice, and data collection. This means that the data underlying a large share of the total fuel chain emissions (e.g. farming, transport, oilseed crushing etc) is based on a 'typical' case rather than a 'conservative' case.

Conservative defaults are based on the 'worst common' practice; that is, the worst practice that occurs with reasonable frequency. This is to encourage the provision of more accurate information whilst still ensuring that the carbon savings are broadly representative of actual performance.

The variation between conservative and typical defaults for steps in the fuel chain is generally between 10 and 20% for a particular input. Although this is significant for the input by itself, the effect on the overall carbon saving of the fuel chain is generally small.

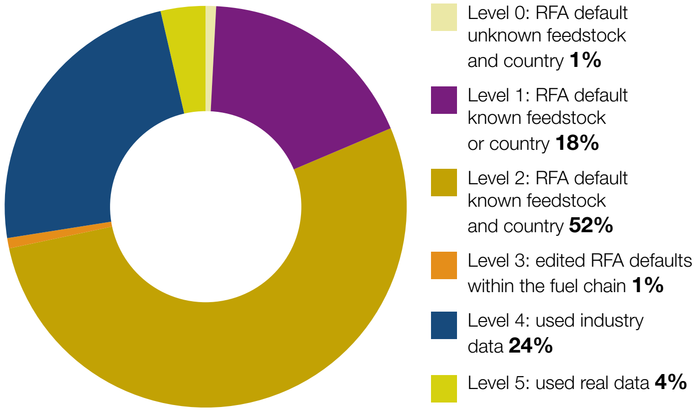
There are single process steps where different practices can have a substantial impact on the overall fuel chain, such as the difference between using biomass and coal to provide process heat. These are typical practices at the process step of the fuel chain for sugar cane bioethanol from Brazil and Pakistan, respectively. As a consequence, whilst Brazilian sugar cane ethanol has a 71% default saving, sugar cane ethanol from Pakistan can result in a 36% increase in emissions relative to petrol.

Accuracy Level of data

The 'Accuracy Level' of the biofuel carbon emissions reported by suppliers reflects the type of data used to determine the carbon emissions. The majority (70%) of the biofuels reported to the RFA used the RFA default carbon numbers (Fig. 3.4). A portion of the RFA fuel chain defaults were replaced with industry data for a quarter of the biofuels supplied. Four percent of the biofuels were reported using actual data to determine the carbon emissions for part, or all, of the fuel chain.

Most of the feedstocks reported using actual data (Accuracy Level 5) delivered better carbon savings than the RFA fuel chain defaults (Table 3.1). However, in general, editing the RFA defaults within the fuel chain or replacing with industry data did not significantly affect the carbon savings. UK sugar beet was an exception where there was a significant saving. Anecdotally, we have been informed through conversations with suppliers that the transport distance has been the most

Proportion of data at each Accuracy Level (0–5) (by volume of biofuel)



Verified data 2008/09 obligation year

Figure 3.4: Accuracy Level

common RFA default to be edited or replaced with industry data. This would not be expected to influence the carbon savings substantially. To achieve more significant changes in reportable carbon savings, data should be collected and passed up the supply chain from the feedstock cultivation stage and/or processing step, for instance on chemical inputs and energy used to operate the plant. It is therefore important to have an effective and verifiable chain of custody in place to claim carbon savings that differ from the RFA defaults.

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

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: 1% of the feedstock and 19% of the country of origin was reported as unknown. To determine the potential carbon savings delivered by these unknowns an analysis was undertaken to determine their carbon savings under 'best', 'typical', and 'worst case' scenarios. An estimate of the effects of these different scenarios on the RTFO carbon savings as a whole was then calculated. The analysis did not assume any land-use change, either direct or indirect.

‘The use of actual data could be further encouraged by a scheme that rewards carbon savings’

Fuel Type	Feedstock	Country of origin	Reported carbon saving			RFA default GHG saving
			Accuracy Level 3: changed RFA default within the fuel chain	Accuracy Level 4: used industry default within the fuel chain	Accuracy Level 5: used actual data within the fuel chain	
Biodiesel	Oilseed rape	France			50%	47%
		Germany	46%		48%	44%
		Ireland			54%	36%
		UK	36%		40%	36%
	Palm	Malaysia		45%		46%
	Soy	United States	33%	31%		33%
	Tallow	Denmark		84%		84%
		UK			85%	85%
		USA	80%	80%		80%
	UCO	Ireland			85%	85%
		UK	84%	85%	85%	85%
Bioethanol	Sugar beet	UK		71%		41%
	Sugar cane	Brazil		71%	81%	71%
Biogas	MSW	UK			69%	58%
Grand Total			62%	60%	61%	

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

Table 3.1: Feedstocks with carbon savings reported using information in addition to RFA fuel chain defaults

The ‘best case’ and ‘worst case’ scenarios assume that where the feedstock or country could not be determined, the biofuel was sourced from a feedstock or country that delivered the highest or lowest carbon savings, respectively. The selection of best and worst examples was from feedstocks and countries that had been reported to the RFA in 2008/09. Additionally, the feedstock allocation was to the best/worst feedstock within that fuel type, and similarly, the country allocation was to the best/worst country of origin reported for that feedstock.

For the ‘typical case’ scenario the biofuels reported from unknown feedstocks and countries were allocated to feedstocks/countries of origin in proportion to the known data.

In the ‘worst case’ scenario, the carbon savings would be reduced from a reported 46% to 43%. However, the typical and best case scenarios would increase the reported carbon savings from 46% to 48% and 50% respectively (Table 3.2).

Therefore, it seems likely that had the feedstock and country of origin been determined for all of the biofuels reported under the RTFO the reported carbon savings would have been higher.

However, the previous land-use was not determined for 42% of the biofuels used in the UK. In all cases where previous land-use was reported, it was ‘cropland’ in November 2005 – no conversion of grassland or forestland was reported. Nonetheless, the large proportion of unknown previous land-use is of concern. If even a small proportion of this was carbon rich grassland or forestland, it could have substantially reduced the carbon savings resulting from the RTFO as a whole, or even resulted in a net release of carbon.

	CO_2e saved, million tonnes	Carbon saving	Change from reported carbon savings
Reported carbon savings	1.56	46%	not applicable
'Best case' carbon savings	1.71	50%	+4%
'Typical case' carbon savings	1.64	48%	+2%
'Worst case' carbon savings	1.46	43%	-3%

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

Carbon savings under the Renewable Energy Directive

The RED has its own LCA methodology, and there are carbon defaults for a number of different feedstocks, listed in the Directive. The LCA GHG methodology for calculating the RED carbon defaults differs from the RTFO methodology in a number of ways, as described on page 43. Additionally, some of the emission and conversion factors used to calculate individual steps within the feedstock fuel chains differ. As a consequence, the feedstock carbon defaults under the RED are different from those under the RTFO; although most are within a few percent of each other.

The RED contains two types of values for lifecycle carbon emissions – 'typical' and 'default'. The typical values are the sum of the emissions from each process stage of biofuel production. The higher default emissions are made conservative by taking the typical value and adding 40% to the greenhouse gas emission from what the Directive defines as the 'processing' stage.

The carbon saving that would have been reported for fuel supplied in 2008/09 had the RED carbon defaults[6] been used is similar to that reported using the RTFO methodology. The analysis indicates that the total emissions reductions calculated using the RED and RTFO methodologies would be 1.64 and 1.56 million tonnes of CO_2e, respectively.

It is worth noting that the feedstock was not known for one percent of the biofuels reported under the RTFO, so this

6 For the carbon savings analysis, the reported emissions for each feedstock were replaced with RED defaults (where available) which are more conservative than the 'typical' RED GHG emissions also listed in Annex IV of the Directive.

Fuel Type	Feedstock	Proportion of total biofuel	Carbon saving[a]	
			RED	RTFO
Biodiesel	Oilseed rape	25%	38%	40%
	Palm	10%	19%	45%
	Soy	34%	31%	28%
	Sunflower	0.2%	51%	26%
	Tallow	9%	83%	81%
	UCO	3%	83%	85%
	Unknown	1%	n/a	36%
Bioethanol	Cheese (by-product)	0.0%	n/a	28%
	Molasses	0.1%	71%[b]	53%
	Sugar beet	3%	52%	71%
	Sugar cane	14%	71%	71%
	Sulphite	0.1%	n/a	93%
	Unknown	0.1%	n/a	28%
Biogas	MSW	0.0%	73%	69%

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

a The RTFO GHG savings are based on the average GHG savings for each feedstock reported for the first year of the RTFO. The RFA has country -specific fuel chain GHG defaults for each feedstock, but the RED defaults are set for each feedstock only, and are not affected by the country in which the feedstock was grown.

b The GHG saving of molasses is not listed in the RED so the GHG saving of sugar cane was used.

n/a not applicable or RED default not available.

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

biofuel would not be eligible under the RED. In addition, the RED default carbon savings for two key feedstocks – palm and soy – do not meet the RED's 35% minimum GHG saving threshold. Soy and palm together accounted for 44% of the total biofuel volume in 2008/09 (Table 3.3).

In order for suppliers to report palm under the RED they will need to either: demonstrate that their process includes capture of methane at the oil mill (default GHG saving of 56%); or use actual data to report an improved carbon saving; or demonstrate that palm had been grown on 'degraded land', which would make it eligible for a 29 gCO_2e/MJ GHG 'bonus'.

‘The previous land-use was unknown for 43% of the biodiesel and 36% of the bioethanol’

In order to report soy, biofuel suppliers will need to demonstrate that their biofuel meets the GHG saving threshold through collection of actual data for some or all of the fuel chain steps, or demonstrate that it was grown on ‘degraded land’ for a 29 gCO_2e/MJ GHG ‘bonus’. For example, to report an improved saving using actual data a supplier could source from a farm that minimised fertiliser input whilst maintaining or increasing yields relative to the defaults.

Suppliers will also need to be able to demonstrate the previous use of the land on which the feedstock was grown in order for their biofuels to qualify under the RED. For the first year of the RTFO the previous land-use was unknown for 43% of the biodiesel and 36% of the bioethanol.

RFA life cycle analysis methodology

Companies supplying biofuels under the RTFO are required to report the carbon emissions. The carbon emissions of biofuels are determined on a life cycle basis from ‘field to wheel’, and compared to the emissions from fossil fuels in order to determine the saving achieved. The boundaries of the life cycle analysis (LCA) start with cultivation of the feedstock and end at the UK duty point (Fig. 3.5). It therefore includes carbon emissions from all the steps along the fuel chain in between, such as feedstock transport, drying and storage of the feedstock crop, conversion of the feedstock to biofuel, and transport to the UK duty point. The major sources of carbon emissions from each step in the fuel chain are listed in Table 3.4.

The life cycle analysis methodology also takes into account any land-use change. Conversion of non-cropland habitats, such as grassland or forest will release both carbon stored in the biomass and the soil, for example through ploughing. However, no carbon penalty is applied where the previous land-use was not reported (accounting for 42% of the biofuels in the first year of the RTFO). Indirect land-use change – where biofuel feedstocks have displaced crops (or other previous uses of the land) to a new area, potentially causing habitat destruction and releasing stored carbon – is currently outside the LCA boundaries. The RFA has recently undertaken work to develop a methodology and case studies that illustrate how indirect land-use change can be avoided (see *Avoiding indirect land-use change*, page 62).

Similarly the indirect effects of wastes and by-products, such as municipal solid waste (MSW) or tallow, are not accounted for. For example, using MSW for biogas avoids emissions

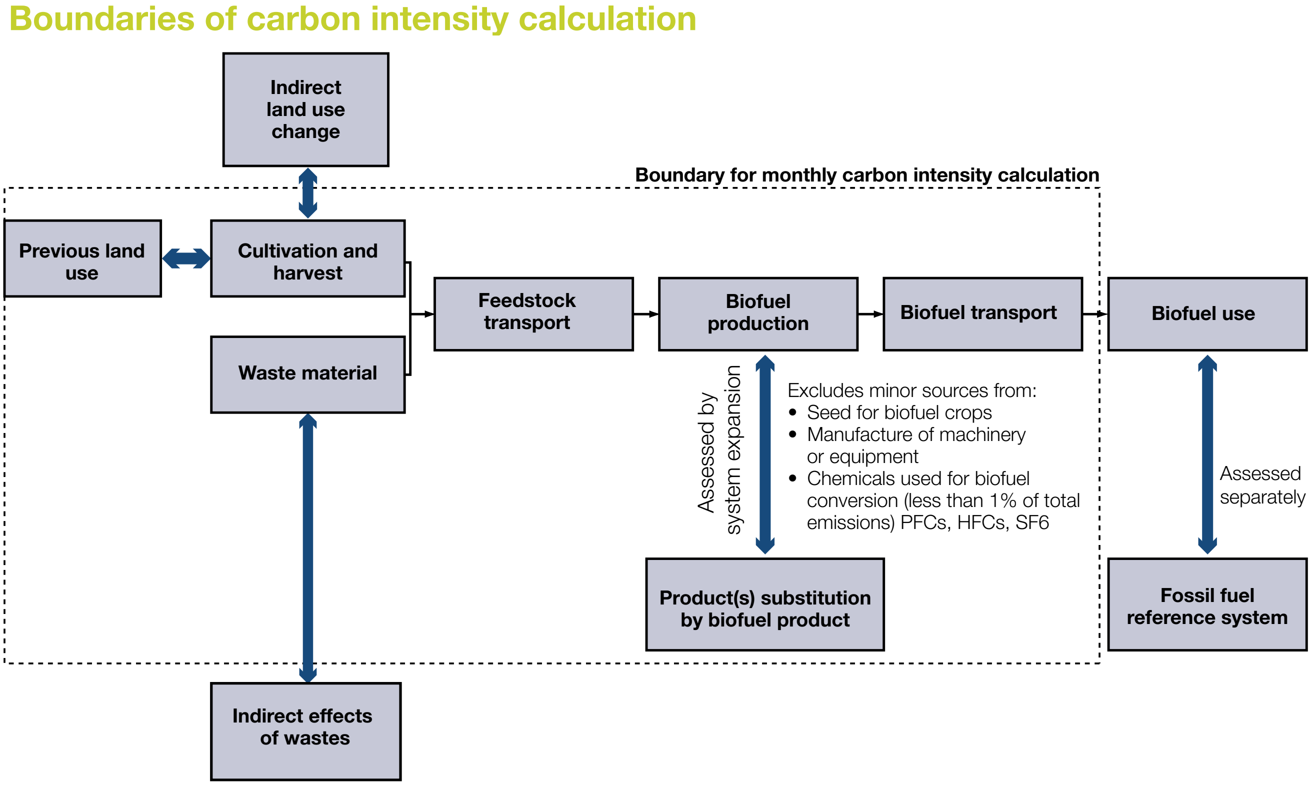


Figure 3.5: Boundaries of the RFA’s carbon emission calculation for biofuels

Step in the fuel chain	Major influences on carbon emissions
Crop production	- Crop yield - Emissions from land-use - N_2O emissions from soil - Fertiliser manufacture - Pesticide manufacture - On farm fuel use
Drying and storage	- Fuel (e.g. diesel, fuel oil, natural gas, coal) - Electricity
Conversion	- Yields - Fuel (e.g. natural gas, fuel oil, coal) - Electricity - Chemicals - Co-products (impact can be positive or negative)
Feedstock transport	- Diesel or other fuel for transport
Liquid or gaseous fuel transport and storage	- Diesel/gas or other fuel

Table 3.4: Most important sources of carbon emissions in a typical biofuel fuel chain

of methane from decomposition of waste, resulting in lower GHG emissions from both road transport and landfill. Conversely, diverting tallow to biodiesel use can cause the other end-users to replace it with more carbon intensive feedstocks such as palm or heavy fuel oil, resulting in higher carbon emissions. For further information on the indirect effects of wastes and by products, including case studies on tallow, MSW, straw, and molasses (see *Indirect effects of using wastes, residues and by-products*, page 59).

It is important to consider indirect effects when assessing whether the biofuel has, across the whole system, reduced emissions of GHGs relative to fossil fuels.

Co-products

Most of the biofuel fuel chains also result in the production of co-products, such as, animal feeds, chemicals, electricity, and heat. Co-products are treated, where possible, through the 'system expansion' method. This means that the carbon emissions of the biofuel include any increased, or avoided, carbon emissions due to an increased supply of a co-product. For example, rape meal, a co-product of biodiesel production from oilseed rape, substitutes for soy meal as an animal feed. Where the data required to identify which product is substituted and the associated emissions is not available, the co-product is accounted for using the 'allocation by market value' approach. This allocates a fraction of the fuel chain carbon emissions to the co-product, in proportion to its value compared to the value of the biofuel, hence reducing the carbon emissions attributed to the biofuel. For example, this approach is used for glycerine, which is a co-product of the biodiesel transesterification.

RED lifecycle analysis methodology

The LCA methodology in the RED is broadly similar to that of the RTFO. The main difference is that the carbon emissions from most co-products are accounted for by using the 'allocation by energy content' method (with exceptions for some wastes and residues). This approach allocates carbon emissions to the fuel and co-products in proportion to their energy content. Excess electricity from co-generation is allocated by (a restricted) system expansion method.

The life cycle carbon emissions under both the RTFO and RED methodology are allocated to the biofuel per unit of energy (CO_2e/MJ of fuel).

N_2O emissions from biofuel feedstock cultivation

The manufacture of nitrogen (N) fertilisers and direct emissions from cultivated soils are the two main sources of nitrous oxide (N_2O) emissions from biofuel production. The volume of these emissions is relatively small, but since N_2O has a global warming potential that is 300 times that of CO_2, they can form a significant part of the total lifecycle emissions for some feedstocks. Based on default values from the RFA's Technical Guidance, N_2O accounts for 85% of emissions from oilseed rape biodiesel and 65% of emissions from wheat bioethanol.

Considerable uncertainties affect the evaluation of these N_2O emissions, especially those from cultivated soils. The Intergovernmental Panel on Climate Change (IPCC) assumes a linear relationship between soil N_2O emissions and N fertiliser application. This approach, which was developed mainly for the preparation of national GHG emissions inventories, has been adopted widely in GHG emission calculations for biofuels carbon and sustainability reporting. The uncertainties in emissions are reflected by the IPCC in relatively large ranges associated with the factor determining the linear relationship.

Modelling approaches such as the DeNitrification DeComposition (DNDC) model are now favoured as a more sophisticated and reliable means of evaluating N_2O emissions from soil, and have been developed for application with all types of cultivation. However, to be used in practical applications these models require validation and calibration through extensive field measurements, over a number of seasons. This research has commenced in the United Kingdom and suitable results are expected to become available up to the planned end date in 2014.

The existing default values for emissions from fertiliser manufacture are based on relatively old data. Future carbon and sustainability reporting could be made more accurate by including current and future reductions in the total GHG emissions associated with N fertiliser manufacture in calculations.

Numerous options have been suggested for mitigating N_2O emissions associated with cultivation. These include the application of different types of N fertilisers, the timing and management of N fertiliser applications, the optimisation of N fertilisation for total GHG emission minimisation, and the utilisation of different cultivation techniques, such as zero- and minimum-tillage. However, at this stage the evidence for the efficacy of these measures is not conclusive. The benefits require comprehensive quantification before clear guidance for practical use by farmers can be promoted, possibly through evolving land management schemes, and supported by relevant GHG emissions tools and calculators.

Looking forward, there is an opportunity to improve data reporting from UK cultivation through the preparation of (initially preliminary and subsequently refined) UK regional maps of the variation of soil N_2O emissions with N fertiliser application rates for relevant arable crops, based on the suitably validated and calibrated UK-DNDC model. Achieving this improved accuracy in reporting for non-UK crops would require regular review of similar mapping exercises in major biomass feedstock producing and biofuel exporting countries. Defining best practice and reducing N_2O emissions globally will require international research on mitigation options and international co-operation on all these matters.

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

Effects of the RTFO in the UK

Impacts of the RTFO on UK business

An assessment of the impacts on UK business of the first year of operation of the RTFO was carried out between September and November 2009. The assessment considered the impact of the RTFO on businesses in the UK and the bearing of a number of unforeseen issues during this period, specifically:

- The discrepancy in the RTFO;
- The US subsidy and the related 'splash and dash';
- The Gallagher Review and the consequent Department for Transport revision to UK biofuels targets.

The assessment included a market review, a literature review and an extensive consultation process with over 50 key stakeholders (including obligated suppliers, biofuel producers and suppliers, vehicle manufacturers, fleet operators and agricultural industries).

The study findings supported the conclusion that the introduction of the RTFO created a new market for the use of biofuels in the UK, increasing supply from less than 1% of road transport fuels in 2007/08 to 2.7% in 2008/09 (the first year of operation). Increased supply was overwhelmingly achieved through imported feedstock (just 9% of feedstock was sourced domestically). This was due to a number of factors, including that imported supplies were generally cheaper (in part because of subsidies, particularly in the US).

Impacts of the RTFO on obligated suppliers

Evidence from fuel suppliers suggests that the original capital costs estimated in the Regulatory Impact Assessment (RIA) were overstated, being as much as twice the actual capital costs incurred. However, the situation is not straightforward, which makes it difficult to make an overall assessment: some costs have been deferred; some were spent prior to the RTFO (as an economic investment); and additional costs e.g. in transfer lines and control equipment were identified. The administrative costs of the RTFO were broadly in line with estimates in the RIA.

Comparison of biofuel and oil prices during 2008/09 indicates that with the 20p per litre fuel duty incentive for biofuels, biofuel was generally cheaper to supply than fossil fuel and suppliers reduced their total costs by up to £107 million (biodiesel £58m, bioethanol £49m). This saving may have been reduced by other costs arising from supplying biofuels, and a proportion may have been passed onto the consumer in lower petrol prices. However, there is no evidence to demonstrate this. The duty incentive is due to end for liquid biofuels (with the exception of biodiesel made from used cooking oil) from April 2010.

Impacts of the RTFO on UK biofuel producers

Although the primary objective of the RTFO is to achieve carbon savings, it was anticipated that the introduction of a long term market based obligation would stimulate UK production alongside imported biofuels.

Stakeholders identified the structured framework the RTFO provides as a key benefit which provided confidence to biofuel producers – a number of businesses identified that the RTFO was the reason why they existed.

Whilst the RTFO created a long term regulatory framework and successfully stimulated the intended overall level of biofuels supply, the benefits to UK producers were more limited than many anticipated. Planned UK capacity had been in line with UK targets, but this capacity has not been realised. Factors negatively affecting UK production included cheaper imports, in particular US subsidised soy biodiesel which undermined UK (and wider EU) competiveness; the RTFO drafting discrepancy; and the reduction in RTFO targets following the Gallagher Review recommendations which undermined investor confidence (addressed in more detail below).

The administrative costs of the RTFO were not large for most businesses, although small biofuel producers were affected proportionally more.

Impacts of the RTFO on small-scale UK biofuel suppliers

Many stakeholders reported that the RTF certificate trading system was less well suited to the needs of smaller suppliers than the existing duty incentive. This was due both to the administrative burden of reporting to the RFA and the time lag between supplying fuel and deriving benefit from RTFCs. Small suppliers using used cooking oil as a feedstock will benefit from a two year extension to the duty incentive.

Impacts of the RTFO on the agricultural sector

UK agricultural suppliers and traders have benefited from the introduction of the RTFO, with five percent of biofuel sourced from UK crops. However, biofuels remain a relatively small market for agricultural suppliers using just four percent[1] of total UK oilseed rape production, and eight percent[1] of UK sugar beet, with no wheat or cereals being reported. The potential benefits of the RTFO for UK agriculture are therefore

1 Note that these figures are estimates by area farmed, and refer only to feedstock grown and used for biofuels in the UK.

not yet being fully realised. Looking forward however, new developments such as the opening of the Ensus plant on Teeside, which is set to be the world's largest wheat-fed bioethanol refinery, indicate a more significant effect in the very near term.

Impacts of the RTFO on other sectors

Overall, fleet operators reported no major issues arising from the increase in biofuel supply. Concern was raised about two issues:

- Fuel quality: some biodiesel blends were of variable quality and in some cases a reduction in efficiency was reported when using biofuels (although these were isolated incidences specific to a small number of operators);

- Fuel technical issues: mainly concerning reports of a required increase in the frequency of tuning engines, cleaning out tanks and replacing parts.

An episode in which jet fuel may have been contaminated by road transport biofuels was identified anecdotally. Fuel quality checks at the airport in question identified an off-specification fuel batch, which may have been due to contamination with biodiesel in a fuel pipeline. Changes in operating procedures for pipelines supplying both aviation and road transport fuels should minimise the risk of such an incident occurring in future.

Impacts of the discrepancy

The RTFO Order (2007) was drafted in a way that inadvertently excluded from the obligation any fossil fuel blended with biofuel before the duty point. As a result obligated suppliers were only legally required to supply about half the intended volume of biofuel in 2008/09. The effects of this on business were mixed. It benefited those yet to deliver their obligation (in terms of development of infrastructure or accumulation of certificates), but had a negative impact on those who had invested in blending ahead of the RTFO. In addition:

- Obligated suppliers will benefit from the ability to carry forward Renewable Transport Fuel Certificates into 2009/10, and will potentially be able to reduce costs after the revocation of the duty-incentive by using certificates from the previous period.

- Some obligated suppliers met their targets without the need to purchase certificates from the market as they intended.

- The discrepancy is reported to have caused a reduction in certificate value from around eight pence per litre to zero. For a small number of obligated suppliers that were over-delivering their target (with the intention of selling RTFCs), this is reported to have resulted in a loss some businesses valued at over one million pounds.

- Small biofuel suppliers who may have anticipated benefits from RTFCs were similarly affected by the collapse in the RTFC market.

Market information indicates that the duty incentive alone was sufficient to meet the additional cost of biofuels for much of the first year of the RTFO. It should be noted, however, that obligated suppliers were benefiting from supplying biofuels at a lower cost than fossil fuel due to the duty incentive. This helped ensure that the original 2.5% volume supply target was exceeded, even though the discrepancy in the RTFO resulted in the legal obligation being reduced to 1.15%. This indicates that deriving additional value from RTFCs was not necessary for the majority of biofuels supplied into the UK market with the duty incentive in place.

The impacts of the discrepancy are likely to carry-over into the 2009/10 obligation period because suppliers are allowed to meet 25% of their obligation each year with certificates issued in the previous period. Data for April to September 2009 shows that supply volumes have been lower than the 2009/10 target (2.9% against a 3.25% target).

Impact of the US Subsidy

A subsidy of one dollar for every gallon of biodiesel blended into fossil diesel in the USA was in place at the start of the 2008/09 obligation period. The US subsidy created a significant market distortion and had a major effect on the competitiveness of EU (including UK) biodiesel suppliers. As a result, biodiesel production throughout the EU was significantly, negatively, impacted between 2007 and 2009. In the UK, the level of biodiesel produced fell by a third between 2007 and 2008. The discrepancy and the DfT's revisions to targets may also have contributed to this. A countervailing import duty was introduced by the European Commission in May 2009 to help reduce the impacts of the US subsidy.

The cheap subsidised supplies imported from the US benefited obligated suppliers, as they were able to source biodiesel significantly more cheaply than fossil diesel once duty differences were taken into account.

Impact of the Gallagher Review and DfT revision to targets

The reduction in RTFO targets in 2008/09 arising from the Gallagher Review had mixed business effects:

- The lower targets have delayed the need for investment in new infrastructure in the UK and this will have benefited companies yet to invest.
- The resultant reduced future demand for biofuels will adversely affect biofuel producers and feedstock suppliers, relative to the originally planned targets.
- The revisions reduced investor confidence making it more difficult to attract funding for biofuel projects (this was compounded by the global financial crisis).
- Stakeholders said that it had reduced business confidence in the RTFO as a long-term framework for supply of biofuels. They indicated the need for Government policy and regulation to be consistent, with four to five years stability required for confidence in investment to return.

There were also specific impacts on bioethanol supply. Due to additional supply infrastructure requirements (unlike biodiesel, bioethanol cannot be used in distribution pipelines) it was expected that the introduction of bioethanol would lag behind biodiesel. Significant supply was anticipated during 2009/10 when fuel blending limits for biodiesel would have effectively required significant volumes of bioethanol supply. However, the reduction in targets has delayed this. Recent changes to fuel quality specifications which allow biodiesel blends of up to seven percent have compounded the effect.

Several planned UK bioethanol production facilities have been delayed or shelved as a result of market conditions. The loss of investor confidence has arisen from both the global financial crisis and revisions to Government targets during a year that made attracting funding for biofuels projects particularly challenging.

Impacts of carbon and sustainability reporting

Whilst widely accepted as fundamental to supporting sustainable biofuels, C&S reporting was anticipated to place an additional regulatory burden on business. Information provided by stakeholders indicated that reporting:

- had a cost to business in sourcing and verifying C&S data through the supply chain similar to RIA estimates;
- provided an excellent learning opportunity prior to the forthcoming mandatory requirements in the RED that was recognised as a benefit for both obligated suppliers and biofuel producers;
- did not create a financial premium for the supply of sustainable feedstock with lower carbon intensity. Those suppliers with an enhanced C&S profile may, however, have benefited from easier market access to some obligated suppliers that had a stronger focus on sustainability.

Key lessons learnt from the first year of operation

The RTFO has, overall, not been onerous to business – either obligated suppliers or vehicle manufacturers. The C&S reporting requirements have imposed new information burdens which have been felt across the supply chain, but have been accepted as necessary by the majority of stakeholders.

The introduction of the RTFO has brought only limited benefits to UK industry in its first year of operation. Whether benefits to UK industry will accrue in the future is currently uncertain: UK supply has to operate in a competitive international market which can be significantly affected by subsidies elsewhere. Investor confidence is low due to both international conditions and changes in Government policy.

The UK Government's implementation of the RED and FQD were seen by industry as key issues going forward. The RTFO, and particularly the C&S reporting requirements, provided a platform and experience from which industry could benefit. However, it was felt that Government needed to understand the oil industry and biofuel trade markets better. Clear GHG targets were considered necessary to ensure the system effectively incentivised the market to supply better performing fuels. Stability in policy and clear long term goals to provide appropriate lead times were considered fundamental to success.

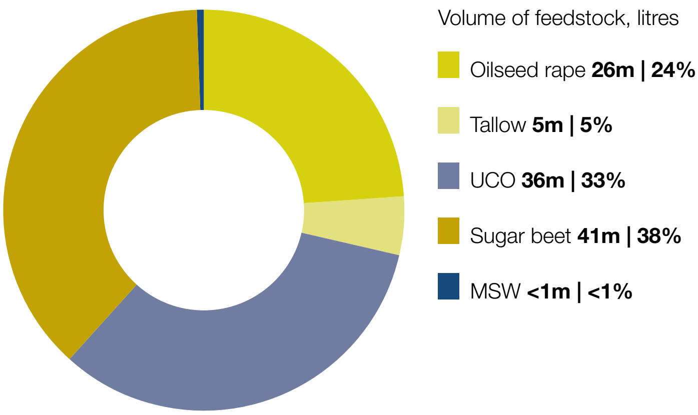
The full study is available available at *www.renewablefuelsagency.gov.uk/yearone*.

Land usage for biofuels from UK feedstocks

Food, animal feed, and bioenergy all compete for agricultural land. Although the current biofuel contribution to global land-use is small, future forecasts raise concerns that increasing biofuel usage will drive unwanted direct and indirect land-use change with negative impacts on sustainability. It is therefore pertinent to examine the area of land used for the biofuel reported under the RTFO.

During the 2008/09 year 8.5% of the biofuel supplied in the UK came from UK feedstock. Of this, 62% was from crops (oilseed rape and sugar beet) and the remainder from by-products (tallow, used cooking oil and MSW).

Proportion of UK feedstock by volume



Verified data 2008/09 obligation year

Figure 3.6: UK feedstock by volume

The farmed area for each crop has been estimated using the yield figures from the RFA's C&S Technical Guidance. Note that any crop grown in the UK for fuel which was supplied overseas is not included here.

Feedstock (UK)	Adjusted[a] volume of biofuel supplied in UK, million litres	Estimated land area to supply biofuel, hectares	Estimated[b] percentage of country's crop by land area
Sugar beet	41.5	9,520	7.9%
Oilseed rape	32.5	23,400	3.9%

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 DEFRA crop area figures for 2008 harvest.

Table 3.5: UK feedstock land usage

Sugar beet

Sugar beet is grown in rotation with wheat, barley or pulses providing a break crop which returns organic matter to the soil and helps to prevent the build up of disease. UK beet farming is mostly in Eastern England, stretching from Yorkshire to Essex. Just over 9,500 ha of UK land was estimated to have been used for sugar beet destined for fuel use in 2008/09. This represents 7.9% of the UK's sugar beet crop. British Sugar is the UK's only sugar beet processor and operates plants making refined sugar products as well as a wide range of co-products including tomatoes and animal feed. Its bioethanol plant is integrated into its sugar factory at Wissington, Norfolk. All sugar beet grown in the UK is grown under contract to British Sugar and there is no technical distinction between beet grown for sugar products and that for ethanol. This means that no changes to variety or farming practice for fuel production have taken place.

Oilseed rape

Oilseed rape is grown as a break crop in rotation with cereals providing benefits for subsequent crops as well as financial return.

Oilseed rape produces more oil per hectare than other non-tropical oil crops, although significantly less fuel per hectare than sugar beet. This means that although more sugar beet ethanol was supplied in 2008/09 than Oilseed rape biodiesel, the land area for the Oilseed rape was estimated at over 23,000 ha, more than twice that for the sugar beet. Our calculations estimate that biodiesel was the end product for 3.9% of the UK's Oilseed rape by area in 2008/09. When oil seeds are crushed to extract the oil, the left over product is protein-rich and is used in animal feed. The land-use calculations have not taken this valuable co-product into account.

Co-products and land demand

As noted above, oilseed rape is far less productive than sugar beet as a biofuel crop. However, this ignores the value of the rape meal co-product. The existence of co-products thus makes it very difficult to adequately compare the land demand of different biofuel feedstocks. The high protein of this co-product makes it suitable for animal feed which can be used instead of other protein sources such as soy, which also require land. Analysis by CE Delft for the Gallagher Review indicated that for rapeseed, soy, wheat and maize, the effect of displacing protein rich crops is to reduce net land requirements per tonne of biofuel by 60-81%.

General farming practice

As with all industries, farming technology is constantly developing. 'Precision farming' technology is starting to be implemented in the UK and has the potential to be able to reduce fertiliser, pesticide and herbicide usage by targeting them more precisely to crop needs and preventing overlap of application areas. This in turn will reduce the GHG emissions associated with the cultivation of the crop. Most of these technologies require significant upfront capital investment by the farm and therefore a clear business case needs to be apparent before the technologies are implemented. Depending on the technology under consideration and the farm size, payback is possible from the cost savings made in fertiliser and other inputs, especially if targeted application leads to increased yields. However, if crop value is increased due to reduced carbon emissions this could further incentivise the implementation. The biofuels segment is expected to be the leading driver in this area since the carbon emissions of biofuels are one of the key reasons for their support. This may come about through the implementation of the FQD which sets carbon reduction targets for fuel suppliers.

Conclusion

In 2008/09 UK feedstocks made a relatively minor contribution to biofuels supplied in the UK. Furthermore, biofuels are currently a minor end use for UK feedstocks. As such, the RTFO does not appear likely to have had a significant impact on the area or the practices in UK agriculture at this stage. This is confirmed by the results of the assessment of the impacts of the RTFO in the UK, which found the RTFO had had little effect on the agricultural markets (see *Impacts of the RTFO on UK business*, page 45).

Looking ahead, ambitious plans for new production facilities to meet the future requirements of the RTFO, particularly for wheat derived bioethanol, can be expected to have a more significant effect on UK agriculture. The RFA will continue to analyse and report on the effects of this expansion in the future.

International effects of the RTFO

Land usage for biofuels from international feedstocks

During the 2008/09 year 73% of the biofuel supplied in the UK came from international feedstock[1]. Of this, 64% was from crops (oilseed rape, palm, soy and sunflower) and the remainder from by-products (tallow, UCO, cheese by-product, molasses and sulphite).

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. These figures have been compared to the total area of this crop in each country.

Feedstock	Country of origin	Adjusted[a] volume of biofuel supplied in UK, million litres	Estimated land area to supply biofuel, hectares	Estimated[b] percentage of country's crop by land area
Oilseed rape	Belgium	0.4	266	2.5%
	Canada	31.9	47,600	0.7%
	France	50.3	34,500	2.4%
	Germany	180.7	114,000	8.4%
	Ireland	0.1	69	0.8%
	Russia	7.9	14,700	2.5%
	Sweden	1.2	1,040	1.2%
	Ukraine	9.9	19,200	1.4%
	USA	12.9	18,000	4.5%
Palm	Indonesia	38.9	12,900	0.3%
	Malaysia	89.2	27,500	0.7%
Soy	Argentina	97.0	211,000	1.3%
	Brazil	8.0	17,300	0.1%
	USA	337.6	716,000	2.4%
Sunflower	Sweden	0.1	88	n/a[b]
	Ukraine	2.3	4,500	0.1%
Sugar cane	Brazil	179.9	31,400	0.4%
	Pakistan	1.9	497	0.0%

a Note that these values differ to those presented in other parts of this report as they have been adjusted to include 'unknown' county and feedstock data. 'Unknowns' have been distributed across the 'knowns' in proportion to the known volumes.

b Based on USDA or FAO figures for crop area as appropriate.

c No data for the Swedish sunflower crop area could be found.

Table 3.6: Estimated overseas land area used for UK biofuels

Adjusted volume of UK biofuel sourced from international crop feedstocks

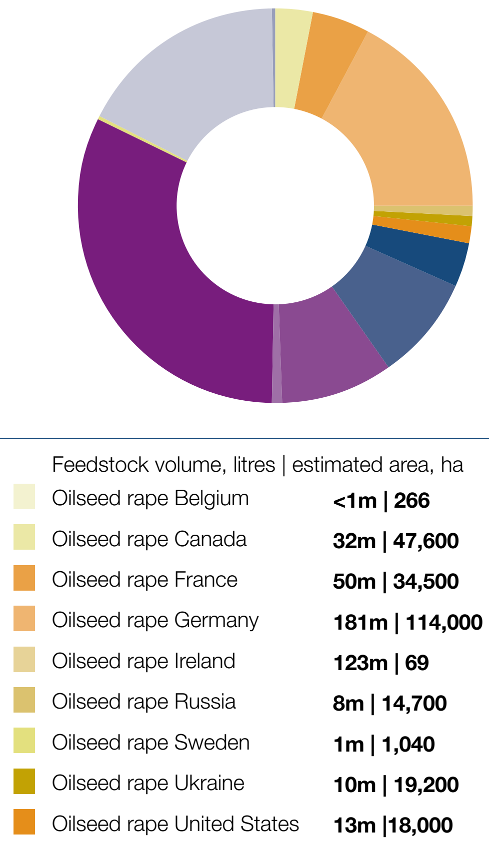


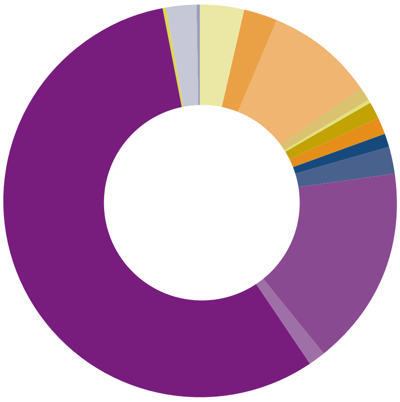
Figure 3.7 a,b: Biofuel volume and crop area

Soy

As can been seen from the data, the feedstock with the largest estimated crop area is soy (944,000 ha). Soy also provided the largest volume of fuel; however, it has a significantly lower oil yield than the other crops and therefore takes a proportionately larger area of land. Soy represents an estimated 42% of the fuel supplied from overseas crops and occupies 74% of the land used. As with oilseed rape (below), there is an animal feed co-product from soybean oil extraction which has not been taken into account in the above calculations. Even given the large areas occupied by soy for UK biofuel, its proportion of the total soy crop area in each country is small. From our analysis 2.4% of the US soy crop has been used for UK biofuel. In comparison only 1.3% of the Argentinean and 0.1% of the Brazilian soy crop were used.

1 A further 19% was of unknown origin.

Estimated overseas land area used for UK biofuels by feedstock and country



Palm Indonesia	**39m | 12,900**
Palm Malaysia	**89m | 27,500**
Soy Argentina	**97m | 211,000**
Soy Brazil	**8m | 17,300**
Soy United States	**338m | 716,00**
Sunflower Sweden	**<1m | 88**
Sunflower Ukraine	**2m | 4,500**
Sugar cane Brazil	**180m | 31,400**
Sugar cane Pakistan	**2m | 497**

Oilseed rape

After soy, oilseed rape required the next largest amount of land for UK supplied biofuels. This was dominated by German rape, which provided the largest proportion of an individual country's production for a feedstock at 8.4%.

In 2007, only 4% of Germany's oilseed rape crop was exported[2], so this represents a significant increase in exports. Interestingly, USDA data indicates that the land area of oilseed rape in Germany actually decreased between 2007 and 2008, so the increase in exports does not appear to be linked to increased land area. The explanation appears to lie in the significant drop in Germany's domestic biodiesel consumption, and a corresponding fall in the production output between 2007 and 2008[2], widely attributed to a change in their tax regime.

2 German country report to IEA Task 40 (July 2009).

Palm oil

In 2008/09, 15% of biofuel from crops was reported to be derived from palm oil. As the palm crop is very land-efficient compared to other oil crops, this required only three percent of the overall land required for biofuels supplied into the UK market. The palm oil supplied came from Malaysia and Indonesia. Taking the working assumption that the palm oil from unknown origin came from these two countries in proportion to their known supply, the land-use as a proportion of each country's total crop was 0.7% for Malaysia and 0.3% for Indonesia.

Sugar cane

Sugar cane was the only crop grown overseas used as a bioethanol feedstock, contributing 80% of UK supplied bioethanol. An estimated 31,400 hectares of land, an area approximately the size of Malta, was required to cultivate sugar cane in Brazil as a feedstock for bioethanol. This represented only 0.4% of the Brazilian sugar cane crop.

Conclusion

Despite the fairly significant volumes of feedstocks required to meet the RTFO, the analysis demonstrates that, thus far at least, UK supplied biofuels used only a small portion of any one country's feedstock production. On the one hand, this emphasises the potential to take measures to increase production in sustainable ways, including avoiding iLUC, and still meet the whole of UK biofuels demand. On the other, it also helps illustrate why the efficacy of national measures to promote sustainability in the biofuels sector is constrained by the relative importance of biofuels as a market.

The EU Renewable Energy and Fuel Quality Directives are expected to significantly increase EU demand for international biofuel feedstocks. This has the potential to increase the negative impact of agricultural expansion. At the same time, however, new sustainability requirements placed on an increasingly large market could provide a catalyst for widespread improvements in the sustainability of agricultural practice.

Case study - Malaysian palm oil

Palm oil based biodiesel attracted the most critical attention of all the biofuel used in the UK under the RTFO. In 2008/09 127 million litres of palm oil biodiesel were reported to the RFA – 10% of UK biofuel usage. Palm is significantly more productive per hectare than any other oil crop, but historically a high proportion of palm expansion has occurred at the expense of primary forest and of peatland. Critics believe increased demand for palm based biodiesel is a major driver of deforestation. Proponents believe palm's high productivity prevents land-use change elsewhere, and that it is a key driver of economic development in Malaysia and Indonesia.

The case study summarised here is focused on palm oil production in Malaysia. Many of the issues, however, are shared to a greater or lesser extent with other producer countries, in particular Indonesia. The full case study is available at *www.renewablefuelsagency.gov.uk/yearone*.

Carbon emissions

If palm oil expansion causes loss of natural forest, the carbon release associated will negate any potential carbon savings from the use of palm biodiesel. Given 'typical' values for forest carbon stock and subsequent plantation carbon stock, and default carbon savings as outlined in the RFA C&S Technical Guidance, the land-use change emissions would take approximately 130 years to repay.

If cultivated on peatland, the situation is worse. Tropical peat bogs hold many times more carbon below ground than is contained above ground in natural rainforest. This is true of forested, logged over, degraded and naturally unforested peatland. The carbon payback for biodiesel feedstock produced on peatland can be measured in millennia.

Some industry voices in Malaysia refute the claims that oil palm is still a driver of deforestation, but there is evidence to the contrary. While deforestation and peat conversion appear relatively restricted in peninsular Malaysia, in the state of Sarawak (where future oil palm expansion appears most likely to be concentrated) peat conversion is legally permitted and NGOs have reported that licenses are routinely granted for projects on forested land. The biodiesel market is widely considered to be a driver of plans to expand palm area. Palm industry organisations have opposed the ban on expansion on peatland under the RSPO standard.

Methane from palm oil mill effluent (POME) ponds is a high source of GHG emissions where there is no methane capture. Capturing this methane substantially improves the lifecycle emissions of palm biodiesel – and the captured biogas can yield a further source of renewable energy. This technology is not typically adopted however, and wider implementation of capture and storage would require investment.

Company	Proportion of company's fuel derived from palm	Proportion of company's palm RSPO certified
BP	6%	100%
Chevron	10%	0%
ConocoPhillips	2%	0%
Esso	13%	0%
Greenergy	4%	0%
Harvest	2%	0%
Mabanaft	14%	0%
Morgan Stanley	22%	0%
Murco	20%	0%
Petroplus	16%	0%
Prax	26%	0%
Total	19%	0%
Overall proportion of UK supply	10%	0.5%

Table 3.7: Companies supplying biodiesel from palm

Other environmental issues

Currently, oil palm cultivation relies on the herbicide Paraquat for weed management. Paraquat is highly toxic to humans and other mammals, and its use is illegal in several EU countries. Its use was made illegal in Malaysia in 2005, but this ban was revoked in 2006. Its use is currently still allowed under the national interpretations of the RSPO principles and criteria. The adoption of safer alternatives is highly desirable.

Agricultural chemical use in palm oil cultivation has a high potential impact on human health. Women, often employed to spray crops, are particularly vulnerable for physiological reasons. RSPO certification goes some way to reducing these impacts.

Plantation establishment, when it requires land clearance, is linked to water pollution and soil erosion. These impacts can be avoided by preventing deforestation for palm.

Social issues

Palm oil is undoubtedly a significant contributor to the Malaysian economy, providing about 5% of Malaysia's GDP. It is also widely acknowledged to cause land conflict, and has a variable record on workers' rights.

Though it provides jobs, reports suggest these are often taken by Indonesian immigrants (sometimes illegal) rather than members of local communities. Historically, it seems that in general there has not been a tradition of constructive interaction between plantation management and communities of workers and/or locals. Low estate wages can limit the contribution of palm to sustainable economic development and make the work unattractive to local communities.

There are opportunities for smallholders to profit from palm oil production. Smallholder yields are lower than larger estates, but these can be improved with access to better seed varieties. Smallholder returns can be limited by structural issues such as effective monopoly relationships with local mills and poor access to finance. Nevertheless, the smallholder model maybe a better driver of sustainable development opportunities than the estate model.

Indigenous communities are likely to find that plantation development on or near their land does not improve their economic circumstances. Affected communities will typically lose some or all of their traditional means of support from the forest, becoming more vulnerable to food and financial insecurity. Many indigenous people have low employability if displaced into an urban environment.

While land conflicts in peninsular Malaysia are relatively unusual, evidence from Malaysian NGOs indicates that in Sarawak state they are almost ubiquitous on new estates, not least because consultation before expansion is often poor. Sarawak law does not provide adequate protection, and does not fully implement the UN Declaration on the Rights of Indigenous Peoples.

RSPO

The RSPO is a relatively young initiative, but is delivering significant improvements and, if further GHG criteria are added, has potential to manage most of the key issues. In particular, implementation can deliver biodiversity benefits and can drive better engagement with local communities. There are gaps in the current criteria – notably on expansion on peatland and other GHG emissions issues.

The scheme has broad support, and provides good assurance that criteria are being implemented, as well as mechanisms to bring grievances. The key challenge to wider adoption is the current poor demand for certified fuel.

On the basis of reported GreenPalm certificate values in November 2009, we estimate that all of the UK's palm based biofuel used in 2008/09 under the RTFO could have been RSPO certified, at a cost of less than one penny per litre of biodiesel. Assuming current supply trends continue; UK suppliers could in future absorb about 10% of the current annual RSPO certified crop. This would boost the scheme, provide substantial assurance for the sustainability of UK biofuel, and increase the likelihood of adoption of GHG standards by underlining the importance of the scheme in assuring EU biofuel imports.

Conclusions

Palm oil has the potential to contribute to sustainable development, and palm oil biodiesel can in principle deliver competitive lifecycle carbon savings. In the future, there are significant opportunities for sustainable expansion in appropriate areas as outlined , although these areas may not be extensive in Malaysia (see *Avoiding indirect land-use change*, page 62).

However, as things stand the industry as a whole cannot be considered sustainable. Expansion appears likely to drive land conflict. Smallholder access to palm oil markets can assist poverty alleviation but there are structural barriers to maximisation of these benefits. The RSPO does, however, set a direction of travel to improve practices and results.

In the short term, the evidence seems compelling that increased demand for palm oil biodiesel is a contributory driver to deforestation and peat degradation in parts of Malaysia. The palm industry cannot become sustainable unless the link between demand and deforestation can be cut.

Case study – Brazilian sugar cane

Production of sugar cane in Brazil

Brazil is the world's leading producer of sugar cane at around 35% of global production, followed by India and China.

Approximately seven million hectares are currently under sugar cane cultivation in Brazil, representing 2.1% of the country's total arable land. The majority of the sugar cane production is in the centre-south region of Brazil (around 90%), with an estimated 60% of the production from São Paulo state alone.

Production of sugar cane in Brazil rose 92.4% between the harvests of 2000/01 and 2006/07 and continues to increase, with the 2009 harvest expected to be 10% above that of the previous year. The sugar cane and ethanol sectors are currently experiencing significant growth, driven by increased market demand – both domestic and international. The introduction of cars which can use both gasoline and ethanol ('flex fuel' cars) is a strong domestic driver.

Sugar and ethanol production are economically very important to Brazil: Sugar cane generates 16.5% of Brazil's agricultural GDP (around 2.5% of the total GDP), and the associated ethanol industries account for approximately 1.1% of Brazil's total GDP.

Sustainable development

The Brazilian government has promoted the potential of the sugar cane industry to reduce poverty by generating employment and stimulating the economy. The sugar and ethanol industries collectively provide almost one million formal jobs in the country. However, increasing mechanisation is expected to significantly reduce the workforce required. The sugar cane industry is supporting re-skilling programmes to reduce the negative social impacts of the mechanisation.

The salaries in the sector are higher than in most other agricultural sectors, although a significant proportion of the workers are temporary, employed only during the seasonal harvest. In some cases, producers undertake social projects that support local communities. However, overall the growth of sugar cane sector is not thought to significantly contribute to reducing poverty and inequity in the producer regions and may increase wealth concentration.

Sustainability of production – environment

Growing awareness of environmental issues both in Brazil and globally has led to concerns over the environmental sustainability of Brazilian sugar cane production. The major issues with regards to the environmental sustainability of Brazilian sugar cane include land-use change, soil erosion, water scarcity, water contamination, burning and air quality.

Supplier	Proportion of supplier's fuel derived from sugar cane	Proportion[a] of supplier's sugar cane sustainability assured
BP	64%	0%
Greenergy	40%	67%
Harvest	52%	0%
Mabanaft	3%	0%
Overall proportion of UK supply	14%	0%

a BSI not yet operational. Suppliers can audit to RTFO Meta-Standard.

Table 3.8: Suppliers reporting bioethanol from sugar cane

In order to meet the rising demand, the production is expected to more than double by 2017. Most of the future expansion is expected to occur on existing agricultural land, though there are concerns about potential expansion in the Cerrado grassland biome and the Pantanal wetland areas. A proposal to introduce agroecological zoning, which is still to be approved by Brazil's congress, is expected to reduce the sector's negative impacts from land-use change by limiting the area where sugar cane can be planted. Other federal laws, such as legal reserves, require a certain portion of a productive landscape to be put aside for conservation (e.g. 35% in the Cerrado). There is also a law that requires that the remaining area of Atlantic forest is protected. However, concerns remain about potential indirect land-use change, for example displacement of cattle ranching and soy production into frontier areas as a result of sugar cane expansion.

Erosion, water scarcity and water pollution are generally more localised problems, while air pollution caused by burning can have widespread effects on the health of workers and surrounding communities. Efforts are currently being made to phase out burning from sugar cane fields in the state of São Paulo and nationally. There are also laws which require that riparian areas (adjacent to waterways) and slopes are not planted with sugar cane, though in practice many companies have been slow to restore these areas.

Sustainability of production – social

The Brazilian sugar cane industry has been criticised by the media and NGOs for social problems, particularly in relation to working conditions of the large manual workforce used in harvesting sugar cane and the use of forced and child labour.

Both the Brazilian government and industry are making significant efforts to improve the working conditions and eradicate bonded labour and use of underage workers. The government maintains a black list of companies found with workers in slave-like conditions, of which four of the 163 entries are sugar cane producers.

While land rights remain a significant problem in Brazil, particularly in terms of inequitable distribution of arable land, landless people, and indigenous groups, there are limited examples of this in the sugar cane sector.

Verification schemes

A number of verification schemes and production standards have emerged in response to sustainability concerns. These include a number of initiatives developed by a range of actors including the national and state governments, private sector companies and banks, as well as international multi-stakeholder initiatives that aim to introduce market-driven certification systems.

In terms of producer participation, the São Paulo Agroambiental Protocol is thought to have the greatest level of involvement compared to other voluntary initiatives. The Sustainable Agricultural Network recently amended their standard to include sugar cane, and producers are currently involved in the certification process. However, the standard is considered to be quite challenging in terms of its environmental and social requirements, and this may be a limiting factor in terms of uptake. The Better Sugar Cane Initiative, which is still under development, has attracted interest from Brazilian producers and the first certificates are expected in late 2010. Furthermore, the Brazilian 'Initiative for the Development of Agricultural Activity Verification System', a Brazilian multi-stakeholder initiative, is developing common standards and procedures for a range of agricultural commodities (but is unlikely to include a certification programme).

The Brazilian Sugarcane Industry Association has been actively promoting the Global Reporting Initiative Sustainability Reporting Framework in the sector.

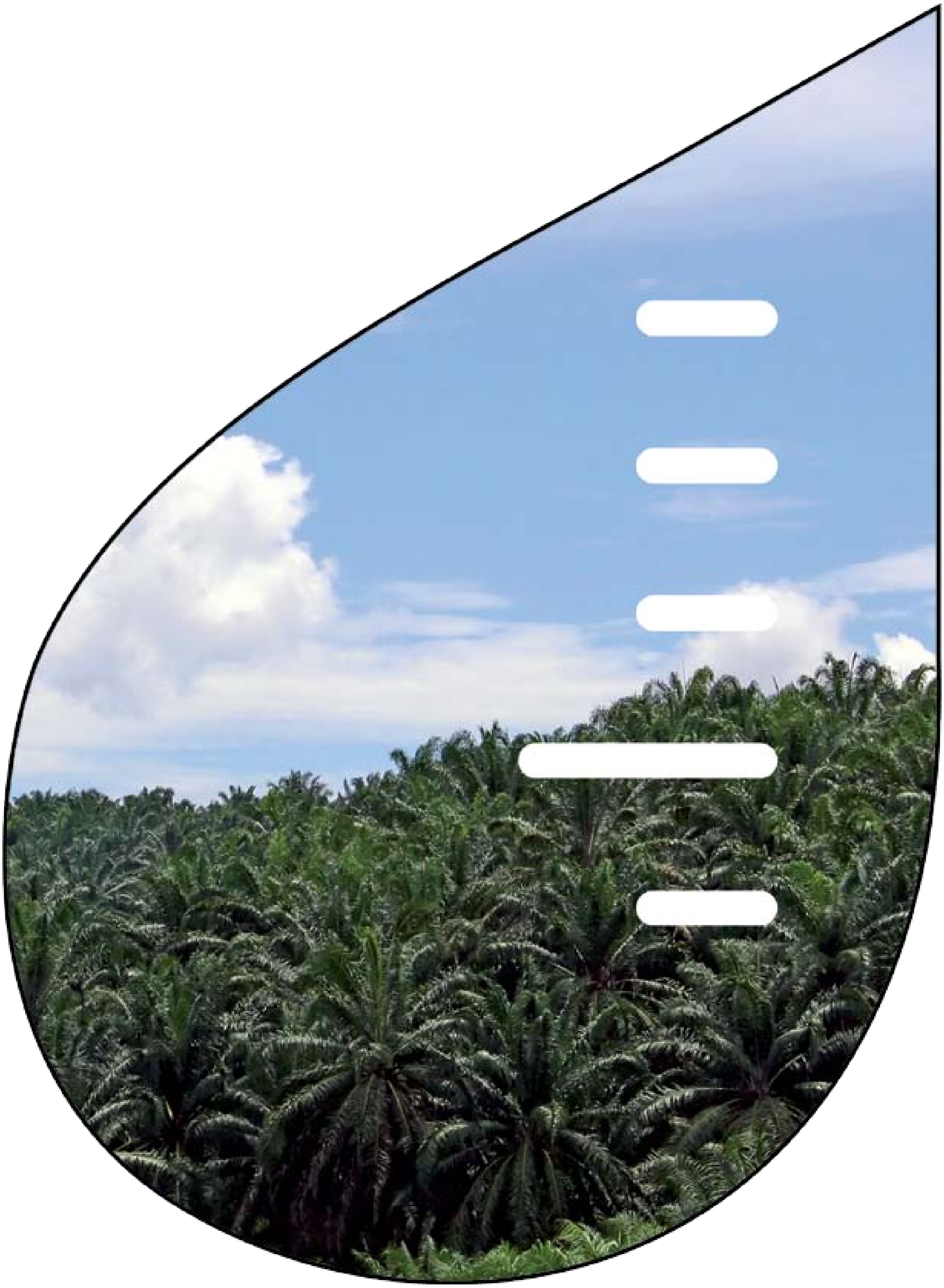
Project lenders such as the International Finance Corporation and Deutsche Investitions- und Entwicklungs-gesellschaft have also undertaken environmental and social assessments of sugar cane producers, and private sector companies including Coca-Cola, SEKAB and Greenergy have undertaken verification of suppliers. The Greenergy verification programme was developed specifically for the RTFO, and is based on the RTFO Meta-Standard.

Conclusion

While there are potentially serious environmental and social impacts for sugar cane cultivation in Brazil, there are many examples of responsible companies following good practices. The development and increasing use of verification initiatives in Brazil serves as a mechanism to communicate good practice to the marketplace, and drive better performance where issues remain.

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

Section 4
Towards sustainable biofuels



'Gallagher' 18 months on

Background

In July 2008 the RFA published the Gallagher Review into the indirect effects of biofuels production. The report was commissioned by the Secretary of State for Transport in response to growing concern about the impact of rising global demands for biofuels on food prices, biodiversity and greenhouse gas emissions. A growing body of academic research suggested that biofuels would effectively displace agricultural production and cause damaging land-use change in other parts of the world. This led to calls for a moratorium on biofuels policies, particularly from NGOs, whilst the agricultural and biofuels sectors questioned the conclusions of the research and modelling. Governments and policy makers in the EU and elsewhere were trying to make sense of this new evidence at a time when many had recently introduced policies to support renewable fuels to tackle global warming and growing concerns about fuel security. In the EU the Renewable Energy Directive (RED), with ambitious proposals for renewable energy targets, was in the final stages of negotiation.

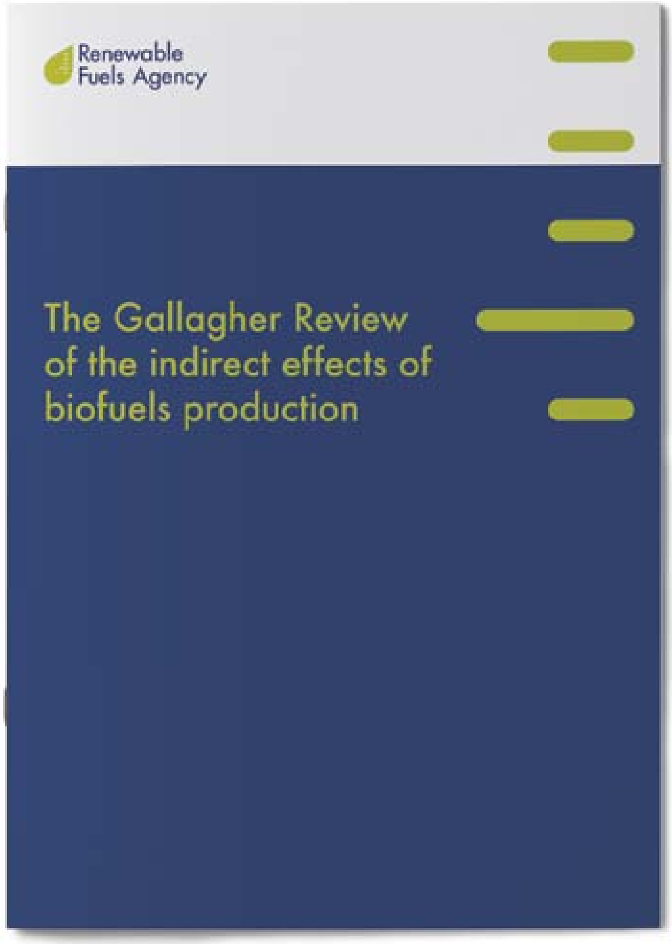
Gallagher Review conclusions

The review concluded that projected increased global demand for biofuels did carry significant risks that required urgent mitigation. It found that, whilst there was probably sufficient land for food, feed and biofuels, current policies did not ensure that additional production occurred in appropriate areas. As a result, the displacement of existing agricultural production was likely to lead to reductions in biodiversity and possibly increases in overall greenhouse gas emissions. It also found that biofuels would contribute to rising prices for some commodities that would adversely affect the poorest, but that the scale of these effects was complex and uncertain to model.

On the basis of evidence gathered, the Gallagher Review concluded that a slowdown in targets was needed whilst appropriate mitigation measures were put in place.

Towards consensus on indirect land-use change

In dealing with such a sensitive issue, the Gallagher Review was always going to attract controversy. For the biofuel community, particularly in the UK where sustainability considerations had been at the forefront of the RTFO, the recommendations to slow down targets were especially unpopular. In contrast, whilst the NGO community generally welcomed the comprehensive evidence base provided by the Review, the recommendation to stop short of a full moratorium was similarly unpopular.



With hindsight, it can be seen that the publication of the Gallagher Review marked a significant shift in the iLUC debate and enabled a new consensus to form: from an argument about the facts and whether iLUC was real or significant at the time of publication, discussion over the succeeding period has instead focussed on how policy should take iLUC into account. Very few commentators today seriously contend that iLUC can be safely ignored. Views on how to address the issue, however, remain contentious.

Policy responses

There was an immediate policy response to the Gallagher Review by a number of national governments. These included the UK, Ireland and the Netherlands who modified their biofuel targets in response to the new evidence.

Following much debate, the target for the RED itself was maintained at 10% of transport energy by 2020. However, a requirement was built into the text for the European Commission (EC) to review the impacts of indirect land-use change and ways to minimise that impact by December 2010. The EC have since conducted an informal consultation on a range of possible policy responses, but with no clear indication as yet of their preferred approach.

In the United States, both in California and at the Federal level ambitious biofuel targets have also been confirmed but iLUC has been acknowledged as a significant factor that should be addressed. The US focus on policy responses has been on modelling work – the indirect land-use change factor (iLUC factor) approach. This approach starts by widening the boundaries of traditional lifecycle analysis (LCA) and attempts to identify displacement effects through economic modelling work. It then calculates the carbon emissions associated in the model with the displacement it has identified. This emission value is an 'iLUC factor', which can be added to traditional direct LCA calcuations to indicate the net carbon effect of the biofuel.

Towards policy solutions

The Gallagher Review noted that most work on indirect effects to date had focussed on attempting to quantify the effects through modelling. The Review recommended that this should continue, but noted that ultimately modelling approaches required subjective assumptions and that the results were inherently uncertain. The Review made the observation that far less work was being undertaken on practical measures that reduce the risk of unwanted indirect effects. Research on iLUC in the intervening period has largely maintained a focus on quantifying the problem.

The Gallagher Review recommended the use of idle land, appropriate wastes and residues, and intensification of production as ways that iLUC might be avoided or reduced. Using approaches that raise overall production of agricultural commodities should also help to limit impacts on food prices. In follow up to this, the RFA commissioned two research projects to develop methodologies and case studies to objectively distinguish 'appropriate wastes' and energy crops with a demonstrably low risk of indirect effects. This work is summarised in the following two chapters.

Food and Fuel

In 2008, modelling work undertaken for the Gallagher Review established that demand from biofuel for food commodities will, in the medium term and other things being equal, exert an upwards pressure on food prices. These price rises would impact particularly strongly on the poor, and result in small percentage increases in levels of poverty. Overall, the negative impact on livelihoods of increased food prices would outweigh any economic benefits accrued by some farmers.

At the same time as the Gallagher Review was undertaken, world food prices reached record levels. With biofuel usage increasing and the overlap between feedstock and food crops, many people concluded that the rise in biofuel usage was driving the spike. Reports analysing the price boom[a,b] have generally concluded that while biofuels demand probably contributed, there were several other factors that were likely to have been equally or more important. These included the concurrent rise in oil prices; the effects of a weak dollar; intense speculation against commodity prices; and poor harvests in some areas in preceding years.

If biofuels demand pushes up food prices, this will have negative impacts on poor people's livelihoods. However, the Gallagher Review argued that these impacts are within our capacity to manage. The cases we have identified (see *Avoiding indirect land-use change*, page 62) in which biofuels expansion will not drive indirect land-use change also offer the opportunity to minimise impacts on food prices, by driving additional production rather than competing for existing food supplies. The Roundtable on Sustainable Biofuels is working on criteria to ensure that biofuel cultivation contributes to local food security. The European Commission is due to report on the impacts of biofuels supplied to meet the RED on food prices in 2012.

a 'The role of demand for biofuel in the agricultural commodity price spike of 2008' – DEFRA (January 2010).

b 'A global overview of vegetable oils, with reference to biodiesel' – International Energy Authority Bioenergy task 40 (June 2009).

Indirect effects of using wastes, residues and by-products

Background

Wastes, residues and by-products (referred to as 'wastes' for short) are often held up as examples of truly sustainable feedstocks for bioenergy, avoiding the sustainability risks associated with land demanding crops and offering particularly good greenhouse gas savings. With growing concern about indirect land-use change, the focus on 'wastes' as a possible solution to the sustainability challenge has increased.

'Wastes' are currently used on a large scale to provide heat and power. They compete for support with other renewable technologies such as wind and solar. In contrast, today's biofuel technologies do not allow the conversion of most 'wastes' into liquid road fuels, but advanced technologies offer this possibility and have consequently received great interest and growing investment.

At the European level, the Renewable Energy Directive (RED) is expected to result in significant new demand for energy from biomass, including 'wastes'. Due to their perceived environmental benefits as feedstocks, and to encourage investment in advanced technologies, the RED requires that transport biofuels made from 'wastes' and 'residues' count twice towards compliance with national renewable energy obligations and the 10% target.

However, recent research, including the RFA's Gallagher Review, has drawn attention to the possible indirect effects of redirecting biomass resources to energy end uses. These effects are not included in the current life-cycle carbon reporting methodologies for the RTFO or the RED, as the system boundaries are drawn too narrowly to capture them (Fig 3.5, page 42). The current methodologies do not consider what *would* have happened to the resource if it were not used in energy applications, and the subsequent effects of its availability being withdrawn from alternative uses or disposal systems.

The RFA and the Department for Energy and Climate Change (DECC) commissioned research to develop a methodology for quantifying the indirect greenhouse gas impacts of using wastes, residues and by-products for biofuels or bioenergy, and to provide an evidence base on these effects through the use of case studies. It considered UK tallow, MSW, straw and molasses. The results from the studies are provided below; the full report is available at *www.renewablefuelsagency.gov.uk/yearone*.

Methodology

The basic approach is relatively straightforward: indirect GHG effects are determined by identifying the existing uses (or disposal pathways) for the material; the possible alternative products switched to; and the emissions resulting from the production of those substitutes (or change in emissions from waste disposal).

The detailed methodology is set out in the full report. It includes an estimation of the level of demand from biofuel and bioenergy, and the estimation of an 'order of dispatch' – the order in which existing users of the feedstock material will switch to substitute materials or alternative production systems at varying levels of increased demand.

One notable aspect of the methodology is that the indirect GHG effect may be different for feedstocks sourced from different localities, regions and countries. For example, the current uses of tallow in the US are significantly different from current tallow uses in the UK, and therefore the indirect effects of using US tallow for biofuel and bioenergy may be significantly different from the use of UK tallow.

Key findings

The use of materials which have existing uses (in the absence of bioenergy usage) is likely to create negative indirect greenhouse gas effects (i.e. create additional emissions which are not currently accounted for in the carbon reporting methodologies for the RTFO or the RED). On the other hand, the use of materials which are disposed of (in the absence of bioenergy usage) can result in large avoided greenhouse gas emissions (i.e. create a reduction in emissions which is not accounted for in current carbon reporting approaches).

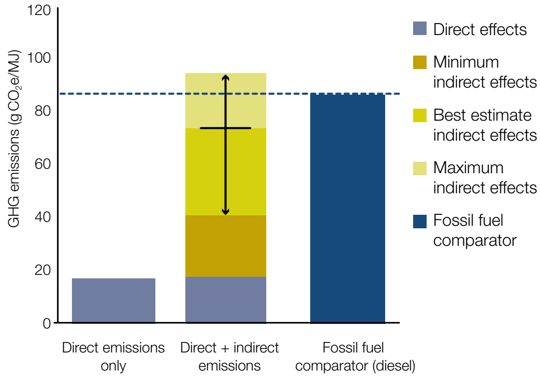
Different levels of certainty are achievable in quantifying the indirect GHG effect for different feedstock materials. The certainty of the assessment will depend on a number of factors: the number of existing uses or disposal pathways; the complexity of the markets in which the material is traded; the number of possible alternative production systems for the material; the range of possible emissions factors for the substitutes and existing disposal pathways; and the availability of data for these factors. The assessment for some materials will therefore be highly uncertain, while for other materials more certainty can be achieved.

Understanding the uncertainty in the assessment of indirect GHG effects is important for interpreting and using the output results. Although there may be low certainty for any individual estimated emission, the findings from an assessment may still allow a clear conclusion if all the outcomes from the assessment point in the same direction (e.g. all outcomes show a negative and significant indirect effect, although the range of possible outcomes is large).

Tallow

The findings for UK tallow show a large range of possible indirect effects (an increase of between 0.89 and 3.03 tCO_2e/tonne of tallow used) – all the outcomes are negative. The graph shows the lower, upper and central estimate figures for the indirect effects of using tallow for biodiesel production, applied to the RFA's default value for tallow methyl ester biodiesel. In the lower bound case, the net (direct and indirect) emissions give a carbon saving of 56% (relative to fossil diesel); in the upper bound case there is a net increase in emissions of 13%.

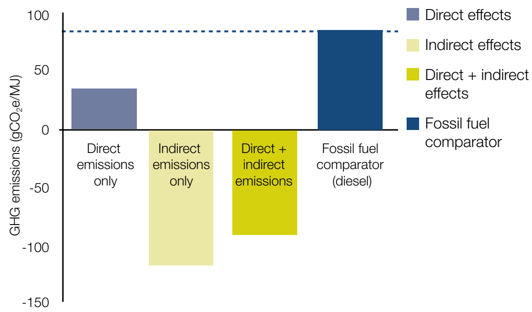
Indirect effect applied to RFA default for tallow methyl ester biodiesel



Municipal solid waste

The indirect GHG effect from the use of municipal solid waste (MSW) is relatively certain, and also positive, in comparison with the other materials studied. The indirect impact of switching one tonne of residual MSW away from landfill is calculated as a saving of 0.5 tCO_2e. For sub-categories of MSW the figures are savings of 0.78 tCO_2e for garden waste, 0.97 tCO_2e for paper and 0.5 tCO_2e for food waste. The graph shows the indirect effect for switching residual MSW away from landfill, applied to the RFA's default value for biogas from UK MSW. The fossil fuel comparator used is fossil diesel. The net emissions show a carbon savings of 193% (relative to fossil diesel).

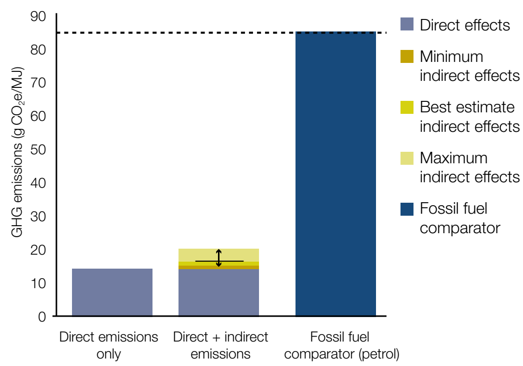
Indirect effect applied to RFA default for MSW methyl ester biodiesel



Straw

The UK wheat straw case study shows a range of possible indirect effects (an increase of between 0.002 and 0.038 tCO_2e/tonne of wheat straw used for biofuels/bioenergy), dependent on the substitutions and data used. It should be noted that none of the possible outcomes show a large indirect effect. Applying a 'most likely' scenario, the indirect effect is estimated to be an increase of 0.0074 tCO_2e/tonne of wheat straw used. Applying this indirect effect value to a direct emissions figure for lignocellulosic bioethanol reduces the net greenhouse gas savings from 81% to an 80% saving (relative to petrol).

Indirect effect applied to RFA default for straw lignocellulosic bioethanol



Molasses

The case study for European sugar beet molasses also shows a range of possible indirect effects (an increase of between 0.1 and 0.4 tCO_2e/tonne of molasses used for biofuels and bioenergy), dependent on the substitutions and assumptions used. These figures equate to an indirect effect of increasing emissions by 18 to 75 gCO_2e/MJ ethanol. Applying these values to the RFA default emission for UK sugar beet molasses results in a range of net greenhouse gas emissions from a 35% saving to a 32% increase (relative to petrol).

Indirect effect applied to RFA default for molasses bioethanol

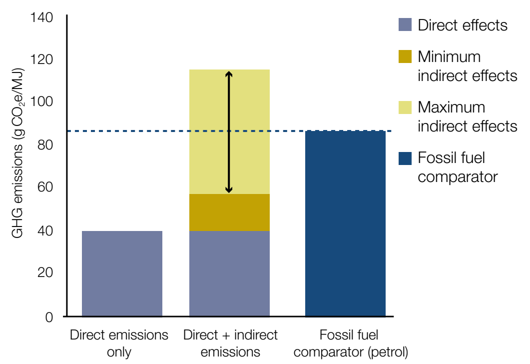


Figure 4.1 a,b,c,d: Indirect effects of using 'wastes'

‘Some ‘wastes’ are very good to use as bioenergy, and some others are not’

Implications for bioenergy policy

As with calculating indirect land-use change, calculating the indirect effects of ‘wastes’ is methodologically challenging, and the nature of indirect effects is such that at least some level of uncertainty is inherent. Nevertheless, the methodology can be used to establish the direction and magnitude of the effect. Significantly, it also illustrates very clearly that some ‘wastes’ are very good to use as bioenergy, and some others are not.

The key issue is whether the particular feedstock is used productively for something else already. The question for policy makers is whether and how to respond to the evidence.

Under the RED, biofuels made from ‘wastes’ and ‘residues’ will count twice towards targets based on the expectation that such fuels offer additional sustainability benefits. If the policy is to incentivise fuels that genuinely offer increased sustainability, the study illustrates that it is important that the definitions of ‘wastes’ and ‘residues’ are qualified to ensure only materials which can be expected to create a significant net GHG saving are counted twice.

It should also be noted that, as with indirect land-use change, there are actions that bioenergy producers may be able to undertake to limit or mitigate their negative indirect GHG effects. These include sourcing materials from countries or regions where the material has low levels of utilisation or has low carbon substitutes; increasing the efficiency of use of the material to free a proportion for bioenergy applications; entering into agreements with existing users of the material to promote the use of low carbon substitutes or alternatives.

Avoiding indirect land-use change

Background

In follow up to the Gallagher Review recommendation to identify demonstrably sustainable biofuels, the RFA commissioned work to develop a methodology that can objectively distinguish energy crops with a low risk of indirect effects. As with the study on wastes and residues, the study results are relevant for bioenergy generally (where purpose grown feedstocks are used) rather than biofuel in particular. The work is based on an analysis of six 'real life' case studies.

How the methodology will be used

The methodology should enable individual companies to initiate projects that can demonstrate that the resultant biofuel has a low risk of indirect effects. It sets out the criteria that would need to be complied with for this purpose and how compliance with these criteria could be demonstrated and verified. The RFA intends to include this methodology as an option for fuels supplied under the RTFO from April 2010 and will put it forward for consideration for inclusion in other biofuel sustainability schemes such as RSB and policies such as the RED.

The methodology and underlying case studies

Indirect effects of additional biofuel feedstock production are the result of a displacement of existing production on land that was already in use for other purposes e.g. existing oilseed rape production that was previously used for the food sector is now used for biodiesel production. The demand for the vegetable oil for food is likely to remain, and therefore can be expected to be met from somewhere else. As the vegetable oil market is quite fungible, the displaced demand could be met from a different feedstock in a different country e.g. Malaysian palm oil. Unless and until all of the agricultural commodity markets adopt sustainability standards, the risk is that the displaced demand will be met from unsustainable sources.

Preventing displacement, by realising additional production instead of displacing existing production, is therefore at the heart of the project level solutions proposed here to minimise the risk of indirect effects.

Case study	How it prevents iLUC	Economic viability	Key barriers	Carbon and sustainability	Potential
	Expanding onto 'unused' land				
Palm oil on *Imperata*[a] grassland	Increase palm oil production without displacement by expanding onto 'unused land'	**Neutral/positive** - Lower planting costs - Lower/equal operational costs - Good yields with good practices - No timber income, but places with high value timber scarcer	- Land right conflicts - Technical barriers for smallholders - Preference for (secondary) forest - Perceived soil fertility - No policy incentives	**Risks** - Informal land rights and uses - Use of pesticides **Opportunities** - Increased carbon stocks - Economic development	> 35 Mha *Imperata* in Asia > 8.5 Mha in Indonesia, 3–4 Mha suitable for oil palm in Indonesia, compared to 4.5 Mha today
	Increasing land productivity of non-bioenergy systems				
Sugar cane – cattle integration	Sugar cane production is introduced while maintaining or increasing milk/beef production	**For the mill owner: neutral** - Few additional investments - Some missed income from excess electricity - Bagasse animal feed sold at cost price **For the cattle owner: positive** - Income increased > 7-fold	- Mill owner has to deal with several cattle farmers - Dependency of cattle farmer for bagasse - Preference for 100% sugar cane for infra investment - Knowledge	**Risks** - Dependence of cattle farmer on mill for their feed - Biodiversity of pasture **Opportunities** - Higher income cattle farmers - Reduced land conflicts - Reduced pressure on land from cattle	> 450 Mha of extensive cattle in South America > 200 Mha in Brazil > 140 Mha suitable for sugar cane in South America, compared to 8 Mha today

a Areas of cleared forest in Indonesia have become overgrown by Imperata. This grass prevents the land from developing naturally into secondary forest and is therefore considered to be problematic (Reinhardt et al., 2007).

For more details and other case studies see the full report at *www.renewablefuelsagency.gov.uk/yearone*

Table 4.1: Information on selected case studies

The proposed criterion for bioenergy feedstock production with a low risk of indirect effects therefore is:

Additional *production has been realised without displacing existing provisioning services of the land*

The methodology focuses on three main options to comply with the above criterion. The feasibility of these options, their economics, barriers, sustainability impacts and their potential were analysed using the following 'real life' case studies:

1. **The use of land without provisioning services[1]:**
   a) *Expanding oil palm production on* Imperata *grassland in Indonesia.*

2. **Increasing land productivity through integration with non-bioenergy feedstock systems:**
   a) *Integration of sugar cane with cattle in Brazil*
   b) *Integration of soy with cattle in a rotational system in Brazil.*

3. **Increasing the land productivity of existing bioenergy feedstock systems:**
   a) *Increasing the yields of an existing sugar cane plantation in the Philippines;*
   b) *Increasing the yields of existing palm oil production in Liberia.*

In addition, the report includes an analysis of a specific feedstock-region mix looking at EU Wheat bioethanol with useful co-products replacing soy meal and grains for animal feed. A summary of two of these case studies is included in Table 4.1.

While the conclusions are specific to each study, overall the case studies demonstrate that there is significant potential to increase bioenergy feedstock production without displacing production for other purposes. For example, the potential for sugar cane expansion in South America through integration with cattle (without displacing the cattle) is several times larger than the current sugar cane area. Another example is the large potential for oil palm to expand without converting forests – in Indonesia alone there may be some 3 to 4 Mha compared to the current 4.5 Mha of palm plantations.

The analysis of EU wheat took a different approach to the other case studies, taking a feedstock-region rather than project level approach.

The analysis found that, whilst this may offer an interesting approach to identify biofuels with a low risk of indirect effects at a higher level of aggregation than at the individual project level, there would remain an element of displacement. Additional analysis would therefore be required on where the displaced feedstock would come from to be able to draw firm conclusions on whether such biofuels offer a low risk of indirect effects.

Whilst the feedstock-region approach requires more analysis, the project level case studies demonstrate significant opportunities that are just as economically viable (or even more so) than the dominant production models that put a higher pressure on land-use change.

1 The Millennium Ecosystem Assessment distinguishes four categories of ecosystem services: provisioning services, regulation services, cultural services and supporting services. Provisioning services are defined as harvestable goods such as fish, timber, bush meat, genetic material, etc. (Commission for Environmental Assessment, 2006).

	'Unused land'	Integration with non-bioenergy system	Increased productivity of existing bioenergy feedstock system
The iLUC criterion	**Additional** production has been realised without displacing existing provisioning services of the land		
Demonstrating additionality	Demonstrate the project activity that increases feedstock production is additional: i.e. in absence of the bioenergy feedstock demand the measure would not have been implemented during the crediting period[a]		
	The land would not have been taken into production	The integration model would not have been implemented	The yield increasing measure would not have been implemented
Setting the baseline	Zero (land previously unused)	Business as usual production levels of non-bioenergy system (e.g. milk or beef)	Business as usual production levels of existing bionergy system
Monitoring	Monitoring of realised bioenergy feedstock production levels	Monitoring that baseline production levels of non-bioenergy feedstock are maintained	Monitoring of realised bioenergy feedstock production levels
Claim that can be made	All realised production has a low risk of indirect effects	All realised bioenergy feedstock production has a low risk of indirect effects	The additional production ('realised production' minus 'baseline production') has a low risk of indirect effects

More details, e.g. on how to demonstrate additionality, are included in the full report at *www.renewablefuelsagency.gov.uk/yearone*

a Crediting period is the finite length of time during which the project's claim of low indirect risks is valid, e.g. 5 or 10 years. The crediting period can be renewed, but this requires a new assessment of additionality and the baseline.

Table 4.2: Summary of methodology

The main barriers to wide-scale adoption are therefore often not of economic nature, but typically find their origins in less quantifiable areas such as organisational issues, land right issues and customary practices. For example, in Indonesia it is difficult to get a permit for palm oil on degraded areas as many of these are officially still classified as 'forest' by the national government. Given the right incentives, the biofuel sector may be able to overcome these barriers – thereby fulfilling (a part of) their feedstock requirements in ways that have a demonstrably low risk of unwanted indirect effects.

Table 4.2 summarises, for each of the three types of solutions, how suppliers can demonstrate compliance and what the claims are that they could make.

Implications for bioenergy policy

The case studies demonstrate that a significant potential exists to increase bioenergy feedstock production economically with a low risk of unwanted indirect effects. The main barriers faced for this economic sustainable potential revolve around matters such as contractual relationships, land rights and customary practices. Whilst not insurmountable, these barriers are nevertheless sufficient that such opportunities appear unlikely to be realised in the absence of targeted policy incentives. The RFA will continue to work on this promising methodology and intends to include it in the RTFO in the future. The RFA will also raise awareness of the methodology with other organisations, including biofuel sustainability standards, national governments and the European Commission.

Development of sustainability standards

Background

The RTFO Biofuel Sustainability Meta-Standard was developed with stakeholders to encourage the supply of sustainable feedstocks for biofuel production, and to provide a clear and credible benchmark for sustainability reporting in the UK. The standard covers key social and environmental principles and criteria, such as biodiversity protection and land rights. The scheme was designed to enable existing feedstock sustainability standards, such as the RSPO, to demonstrate compliance with the Meta-Standard, provided that they cover sufficient criteria. The RTFO Meta-Standard is the world's first operational reporting scheme for biofuels implemented by a national government, and was intended as a stepping stone to mandatory performance requirements.

From December 2010, biofuels that count towards either the RED or Fuel Quality Directive (FQD) targets will have to meet mandatory carbon and sustainability requirements defined by the EC. These include a minimum GHG saving threshold and the exclusion of feedstocks from land with high biodiversity or high carbon stock. The requirements also include reporting items on environmental and social issues such as impacts on air, soil and water and labour conditions. The EC will report in 2010 on the impact of iLUC on GHG emissions from biofuels and ways to minimise that impact. This could include a proposal to include the impacts of iLUC in the GHG methodology for biofuels in the Directive.

As well as providing assurance against the RTFO Meta-Standard, voluntary feedstock sustainability standards are also likely to have a role to play in helping suppliers meet the RED and FQD requirements. This report assesses the current status and prospects of these standards, and the role the RTFO has had in encouraging their development.

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

Current status of feedstock and biofuel sustainability standards

While very few sustainability standards were in place when the RTFO started in 2008, there has been significant activity over the last few years to develop standards for tropical feedstocks such as palm oil, soy and sugar cane. Several are

	Status	Sustainability criteria					Current scope / coverage	
		RED biodiversity	RED carbon stock	RTFO Environmental	RTFO Social	iLUC	Biofuel feedstock(s)	Countries
ACCS	Operational	Yes	Partial	Meta-Standard	No	No	OSR, sugar beet, wheat	UK (ENG, Wales)
BSI	Due 2010	Not assessed	Not assessed	No	Meta-Standard	No	Sugar cane	AUS, BRA, DOM, IND
FSC	Operational	Yes	No	Qualifying Standard	No	No	Wood, wood fibres	all regions
Genesis QA	Operational	Yes	Partial	Meta-Standard	No	No	OSR, sugar beet, wheat	UK
LEAF	Operational	Partial	No	Qualifying Standard	No	No	OSR, beet, wheat	UK +17 countries
RSPO	Operational	Yes	Partial	Qualifying Standard	Qualifying Standard	No	Palm	IDN, MYS PNG
RTRS	Due June 2010	Partial	No	Qualifying Standard	Meta-Standard	No	Soy	ARG, BRA PRY, IND
SAN/RA	Operational	Yes	Partial	Qualifying Standard	Qualifying Standard	No	Palm, soy, sugar cane, sunflower	19 countries

ACCS - Assured Combinable Crops Scheme, **BSI** - Better Sugar Cane Initiative, **FSC** - Forest Stewardship Council, **Genesis QA** - Genesis Quality Assurance, **LEAF** - Linking Environment And Farming, **RSPO** - Roundtable on Sustainable Palm Oil, **RTRS** - Round Table on Responsible Soy, **SAN/RA** - Sustainable Agriculture Standard/ Rainforest Alliance

ARG - Argentina, **AUS** - Australia, **BRA** - Brazil, **DOM** - Dominican Republic, **ENG** - England, **IDN** - Indonesia, **IND** - India, **MYS** - Malaysia, **PNG** - Papua New Guinea, **PRY** - Paraguay, **UK** - United Kingdom

Table 4.3: Overview of feedstock sustainability standards

expected to become operational during 2010, but challenges remain in ensuring that they both meet the RED requirements and provide sufficient certified volume on the market.

Fewer standards are available for moderate climate feedstocks, such as oilseed rape, wheat or sugar beet. ACCS, Genesis QA and LEAF in the UK are exceptional in this regard within the EU, but even these do not currently meet the full RED requirements.

Table 4.3 gives an overview of the operational status and current scope in terms of sustainability criteria covered and geographical and feedstock coverage of the current Qualifying Standards[1] under the RTFO, including coverage of the RED sustainability criteria.

In general, all of the Qualifying Standards benchmarked under the RTFO show good coverage of the RED biodiversity criteria, but poor coverage of the RED carbon stock criteria. Indeed, very few standards include any explicit GHG considerations in their criteria. BSI is a notable exception to this rule and RSPO has a working group discussing the issue. In addition, none of the standards currently cover iLUC.

Looking across the standards benchmarked there is generally a weaker coverage of social issues, although the (not yet operational) RTRS and BSI are exceptions.

Whilst not assessed in detail, few standards appear to have an operational certification scheme for a mass balance chain of custody, as required by the RED. Putting in place an operational, robust and RED-compliant chain of custody will be one of the key challenges for feedstock standards going forward.

In addition to the RTFO Meta-Standard, a number of biofuel sustainability initiatives are currently in development. These international initiatives tend to cover a broader range of criteria and have the potential to have a very large impact. However, by their nature many actors are involved which often means that their development can take a long time (CEN, ISO and GBEP timescales, in particular, are quite vague) and ultimately may involve making compromises on criteria.

	Type of standard	Status	Sustainability criteria[a]					Current scope	
			Biodiversity	Carbon stock	Soil, air, water	Social	iLUC	Feedstock(s)	Geographic focus
RSB	Certification standard	Pilot testing (due 2010)	Yes	Yes	Yes	Yes	No	All (biofuels)	Global
GBEP	Framework for governments	In development	Yes	Yes	Yes	Yes	Yes	All (bioenergy)	Global
RED/ FQD	EU Directive	Due to be implemented in Dec 2010	Yes	Yes	Non-mandatory	Non-mandatory	No (report 2010)	All (biofuels/ bioliquids)	Global (for EU supply)
CEN	European norm	In development	Yes	Yes	No	No	No	All (for energy application)	Global (for EU supply)
ISO	International norm	In development	Unknown	Unknown	Unknown	Unknown	Unknown	All (for bioenergy)	Global

a These biofuel sustainability standards have not yet been benchmarked against the RED or the RTFO. The Sustainability Criteria columns aim to provide insight into whether the standards include criteria on specific aspects, rather than to indicate compliance / coverage with RED or the RTFO.

RSB - Roundtable on Sustainable Biofuels, **GBEP** - Global Bioenergy Partnership, **RED/FQD** - Renewable Energy Directive/Fuel Quality Directive, **CEN** - European Committee for Standardization, **ISO** - International Organization for Standardization

Table 4.4: Overview of international Biofuel Sustainability Standards

1 A 'Qualifying Standard' under the RTFO is defined as a standard that meets sufficient sustainability criteria to provide a minimum level of assurance without meeting the full requirements of the Meta-Standard.

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

The influence of the RTFO Meta-Standard on the development of sustainability standards

The RTFO Meta-Standard approach was intended to create market demand for sustainability certification schemes. When benchmarking standards the RFA aims to be transparent and to engage with the standard owners, providing recommendations on how to improve the standards.

The RFA has had some success to-date in encouraging standards to adapt to be closer to the RTFO or RED/FQD requirements:

- ACCS, when first benchmarked in 2007, did not meet the Qualifying Standard level. A number of meetings were held with ACCS to explain the potential opportunities provided by the forthcoming RTFO, and to make recommendations. ACCS and its sister standard, Genesis QA, now both meet the full RTFO Environmental Sustainability Meta-Standard. 6.7 million litres of fuel from ACCS certified feedstock was reported in 2008/09.

- An RFA benchmark of BSI’s first draft standard for sugar cane showed that the standard would not meet the level for an Environmental Qualifying Standard. The RFA continues to engage with BSI and hopes that the final version will become an Environmental Qualifying Standard.

- An RFA benchmark of the RTRS first draft principles and criteria demonstrated that it met the Environmental and Social Qualifying Standard but not the full Meta-Standard. Following recommendations to the standard owners, the latest ‘Field Testing Version’ includes further criteria that may now meet the full RTFO Social Meta-Standard level.

The RFA was pioneering in the development of the RTFO Meta-Standard reporting system. It was published at a time when increasing worldwide attention was turning towards the sustainability of biofuels, and as the first operational scheme of its kind has demonstrated what can be achieved. As such the Meta-Standard has been influential in the development of other standards around the world, in ways beyond direct engagement with the RFA. The RTFO appears to have served as a model for (parts of) several other schemes, for example, the RED, RSB and in the SAN/RA energy crops addendum, which is very much in line with the RTFO principles and criteria.

The RFA intends to continue to work with standards owners in the future to promote the most sustainable biofuels. The RFA has written to all benchmarked standard owners with the results of a benchmarking exercise of their standard against the current RED/FQD criteria, with, where necessary, recommendations on how the standard could adapt to meet the new requirements[2].

Future outlook

A number of the feedstock standards owners have indicated that they are making an active effort to comply with the RED criteria. These include RTRS, BSI and potentially LEAF (who will be consulting on revisions shortly). Market demand is likely to be key in determining how other schemes respond, including ACCS who review their standard on an ongoing basis.

All of the sustainability standards being developed specifically for biofuel appear likely to aim for RED compliance.

As the standards develop over the coming years it is likely that we may see two broad approaches: those standards that focus on (the minimum level of) RED compliance, and those that focus on a higher level of sustainability on a voluntary basis, such as the feedstock round tables, RSB, and potentially the RTFO Meta-Standard.

2 The RFA assessment is provisional since not all of the RED requirements are yet fully defined. The Commission are developing their own assessment procedures to ensure a consistent approach across the EU.

Section 5
Concluding remarks

Concluding remarks

Year One

This first RFA report to Parliament on the RTFO provides clear evidence that, sourcing biofuels responsibly is not only theoretically, but both practically and economically achievable.

Our report has, in great detail, reviewed the operation of the RTFO, of ourselves as regulators and, using data verified by third parties, the performance of companies supplying biofuels.

The RTFO has broadly met the Government's intentions and expectations, and carbon and sustainability reporting has, as a stepping stone to mandatory sustainability, been a driver of action by suppliers.

The greenhouse gas (GHG) savings achieved have been in line with the predictions of the Regulatory Impact Assessment, although we are clear that, for now, indirect effects are not accounted for, nor has all previous land-use been identified.

We are concerned that the proportion of fuel reported meeting an environmental standard is only 20%. It is clear that not only are certified sustainable biofuels available, but the opportunity to develop compliance with our Meta-Standard provides a route to reporting sustainability where satisfactory standards do not exist.

Encouragingly, although the verification process has resulted in some changes to data, the provisional figures we published in July 2009 have been largely confirmed. As was perhaps inevitable for the first year of a system that requires a fundamental overhaul of the way that UK fuel suppliers think about biofuels and operate chain of custody systems, there has been a need for some companies to revise claims on sustainability.

Such changes and the challenges made to some claims have demonstrated that the checks and balances in the RTFO system are working well. Active engagement and consultation between the RFA and fuel suppliers has enabled us to make sure that unverifiable data has very much been the exception and not the rule.

Year Two

The RTFO data presented in this report reflects biofuel supplied to the UK market at least nine months before publication. It is perhaps useful to make some observations on apparent performance since then.

At the time of writing, we are already half way through the 2009/10 reporting year, and are beginning to have an idea of what to expect in the second year's results. Several obligated suppliers have started the second year well, meeting all three of the increased targets.

Although we are seeing progress on the sourcing of biofuel meeting sustainability standards, it seems likely that most suppliers will again fall short of the Government's target for 2009/10.

It is my expectation that suppliers with experience of RTFO year one should find the next verification process both less burdensome and less likely to require revisions to data. Perhaps more importantly, when sustainability criteria become mandatory the groundwork laid and experience gained in these first years of non-mandatory reporting will allow UK business to make a smooth transition.

The lack of available standards for many feedstocks remains a barrier restricting the capacity of companies to source certified fuels. However, in cases where certification is active and a surplus of certified feedstock is available, suppliers in the UK could support the market for sustainable crops by paying the premium necessary to purchase this certified feedstock. For palm, at reported certificate prices (as in November 2009) this premium could be less than one penny for every litre of biofuel, and the market surplus could easily meet the whole of UK palm for biodiesel demand in 2009/10 – raising sustainability performance for the obligation as a whole by ten percent.

Overall performance could also be raised by independent sustainability auditing. At least one company is committed to implementing RTFO Meta-Standard auditing for German oilseed rape. If applied by all suppliers using this source of feedstock, audits could raise overall performance by over ten percent.

Towards the RED

The Renewable Energy Directive introduces a step change in the regulation of biofuel sustainability in the EU – the prohibition on sourcing biofuel from high carbon and high biodiversity areas will provide valuable assurance that the EU is not directly driving carbon emissions or loss of the most valuable habitats.

The mandatory criteria are not the end of the story, and reporting at company, state and Commission level on other sustainability impacts of biofuels will be crucial. It is our belief that the best way to manage the impacts of biofuel production on soil, air and water quality is through robust environmental sustainability assurance designed for specific feedstocks, namely assurance schemes and independent audit criteria such as we have previously benchmarked against the RTFO Meta-Standard.

Social criteria under these schemes can also help make biofuels cultivation truly benefit the communities in which it occurs, ensure land rights are respected and protect the rights of agricultural workers. Such criteria can also ensure that free, prior and informed consent of local communities is a necessary pre-condition of biofuels expansion.

Indirect effects

Eighteen months ago, the Gallagher Review made it clear that dealing with indirect effects was a necessary pre-condition of a successful long term approach to biofuels policy. Since then, our work (and that of others in the field) has led to iLUC and food price being written into the Renewable Energy Directive as areas where the impacts of biofuels must be assessed.

It is worth reminding ourselves that the Gallagher Review concluded that sustainable biofuels are possible, and pointed to the potential for using idle land and optimising the use of appropriate wastes and by-products. Within this report, we have presented five cases in which actively addressing iLUC at the plantation level is shown to be possible.

Of course, our illustrations are not an exhaustive list. Rather the examples and methodology we have set out point towards a wider range of analogous cases where integrated land management, a focus on currently unproductive land and the best use of 'wastes' will allow iLUC to be avoided and impacts on food prices to be minimised.

The European Commission will report by the end of 2010 on iLUC, and has already pre-consulted on possible options for dealing with it. The UK Government responded favouring a combination of an iLUC factor and bonuses where iLUC can be avoided. Our research demonstrates how this could be implemented, providing a set of cases where a possible future iLUC factor could be waived, and bonuses offered.

Our emerging role

We have ongoing programmes of both research and direct engagement, pushing the boundaries of the science of biofuel sustainability and sharing the benefits of our experience.

We are committed to working not only with other EU member states as mandatory sustainability under the RED approaches, but also to engaging with emerging biofuel regulators beyond the EU. This active global involvement will not only serve to enhance biofuel sustainability reporting in other countries, but provide us with invaluable opportunities to take advantage in the UK of the benefits of the lessons learnt by colleagues in other countries.

The RFA is also looking to continue to develop meaningful relationships with producers and processors wherever they are, and to increase the understanding of the biofuels the UK will need to achieve its targets sustainably.

In conclusion

Truly sustainable biofuels are possible. However, this needs ongoing commitment from those suppliers that performed well in 2008/09 and a step change in the approach of companies that are yet to reach this level. The RFA is continuing to work to support and strengthen sustainability schemes that can provide assurance of sustainable production. Indirect effects from biofuels can be managed, but will require governments to make this happen. Our post-Gallagher iLUC work in particular has mapped out one route. The study on the indirect effects of wastes suggests a methodology to determine which wastes and residues should be counted twice.

We remain committed to sharing our world-first experience in operating a sustainability reporting scheme for biofuels, to studying emerging issues and to continue to work collaboratively with our stakeholders to ensure that our use of biofuels is sustainable.

Nick Goodall
Chief Executive

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Renewable Fuels Agency
Ashdown House
Sedlescombe Road North
St Leonards-on-Sea
East Sussex TN37 7GA
UK

T 020 7944 8555
E contact@rfa.gsi.gov.uk
www.renewablefuelsagency.gov.uk

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