

# **2010/2011 RENEWABLE TRANSPORT FUELS OBLIGATION**

**An annual report prepared by Shell UK**







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**BRAZILIAN SUGAR CANE ETHANOL  
PRODUCES LESS CO<sub>2</sub>, FROM CULTIVATION  
THROUGH TO USE, THAN ANY OTHER  
CONVENTIONAL BIOFUEL AVAILABLE  
IN COMMERCIAL VOLUMES TODAY. //**



# CHAPTER 1: INTRODUCTION

## MAKING TRANSPORT MORE SUSTAINABLE

The number of vehicles on the road could increase from 900 million to more than two billion by 2050. As global transport fuel demand increases, we will need all the sustainable options available to us. Electric and hydrogen fuel cell vehicles will be important in the longer-term. Biofuels offer a low-carbon alternative to gasoline and diesel today.

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**WE BELIEVE THE  
BIOFUELS AVAILABLE  
TODAY ARE THE MOST  
REALISTIC COMMERCIAL  
SOLUTION TO REDUCE  
CO<sub>2</sub> EMISSIONS  
AND DIVERSIFY THE  
TRANSPORT FUELS  
SECTOR OVER THE  
NEXT TWENTY YEARS.** //



## SHELL AND BIOFUELS

We believe the biofuels available today are the most realistic commercial solution to reduce CO<sub>2</sub> emissions and diversify the transport fuels sector over the next twenty years. Shell has been involved in distributing biofuels for over 30 years, and the group is currently building capacity in conventional biofuels produced from more sustainable feedstocks that meet our high corporate and social responsibility standards. Shell is one of the world's largest distributors of biofuels (approximately 9.5 billion litres in 2010) and, in June Shell and Brazilian company Cosan formed Raizen, a \$12 billion downstream joint venture (JV) for the production of ethanol, sugar and power, and the supply, distribution and retail of transportation fuels in Brazil.

This marks Shell's first move into the production of today's biofuels and make us one of the world's largest biofuels producers.

The JV enables Shell and Cosan to establish a scalable and profitable business in more sustainable biofuels by building a market-leading position in Brazil, the most efficient ethanol producing country in the world. The majority of the ethanol produced by this JV will be used domestically in Brazil. With annual production capacity of about 2 billion litres per annum, the JV would be one of the world's largest ethanol producers. Brazilian sugar cane ethanol produces less CO<sub>2</sub>, from cultivation through to use, than any other conventional biofuel available in commercial volumes today (around 70% less than conventional gasoline).

## ADVANCED BIOFUELS

Advanced biofuels, such as those using crop wastes, inedible crops or new conversion processes, offer the potential for improved CO<sub>2</sub> reductions and improved fuel characteristics. Shell was one of the first energy companies to invest in advanced biofuels. Our technology division has a dedicated bio team working in four research centres in the UK, the US, the Netherlands and India. These are complemented by agreements with experts in academic institutions across the world<sup>1</sup>.

Shell has technical partnerships with leading biotechnology companies exploring new technology platforms for the production of advanced biofuels. These include the processing technology that enables ethanol to be made from straw using enzymes (logen), the development of 'super-enzymes' for biofuel production (Codexis) and a joint development programme to convert plant sugars and biomass directly into gasoline and gasoline blend components (Virent). Breaking down and converting new biofuel feedstock options into fuel is far more complex than converting the crops used to produce some of today's biofuels. Processing them efficiently at scale, in terms of cost and CO<sub>2</sub> emissions is challenging. It takes considerable time and investment, but we are successfully progressing new technologies from lab-based process to demonstration phase and towards commercial scale-up.

In the long term, biofuels will need to be cost competitive with all transport fuels. Policy that recognises and rewards best practices and certified CO<sub>2</sub> savings will accelerate development.



**SHELL WAS ONE OF THE FIRST ENERGY COMPANIES TO INVEST IN ADVANCED BIOFUELS. OUR TECHNOLOGY DIVISION HAS A DEDICATED BIO TEAM WORKING IN FOUR RESEARCH CENTRES IN THE UK, THE US, THE NETHERLANDS AND INDIA.**

## SUSTAINABILITY CHALLENGES

Shell recognises the direct and indirect sustainability challenges associated with the production of biofuels, including concerns about working conditions, competition for agricultural land, land use change, impacts on local communities, and the use of water.

We also recognise that the well-to-wheel CO<sub>2</sub> performance of biofuels can vary widely depending on the feedstocks, production and processing techniques used. We are working to support more sustainable ways of producing biofuels, addressing direct and indirect impacts to safeguard environment and communities.



<sup>1</sup> Massachusetts Institute of Technology (MIT), Massachusetts, US; University of Campinas (Unicamp), Sao Paulo, Brazil; Institute of Microbiology, Chinese Academy of Sciences (IMCAS), Beijing, China; Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Sciences (QIBEBT), Qingdao, China; Centre of Excellence for Biocatalysis, Biotransformations and Biocatalytic Manufacture (CoEBio3) based at Manchester University, UK; School of BioSciences Exeter University, UK.

## SHELL'S APPROACH TO SUSTAINABLE SOURCING

Our efforts are focussed in three areas, reflecting the differing spheres of influence.

The first area is Shell's biofuels supply chain. As a significant purchaser of biofuels for blending, Shell has been championing sustainability standards in our own biofuels supply chain for a number of years. The supply chain for biofuels can be long and complex (see Figure 1). For Shell and other companies towards the end of the

chain, assessing whether there are effective controls throughout can be a major challenge, but it is one we are determined to address.

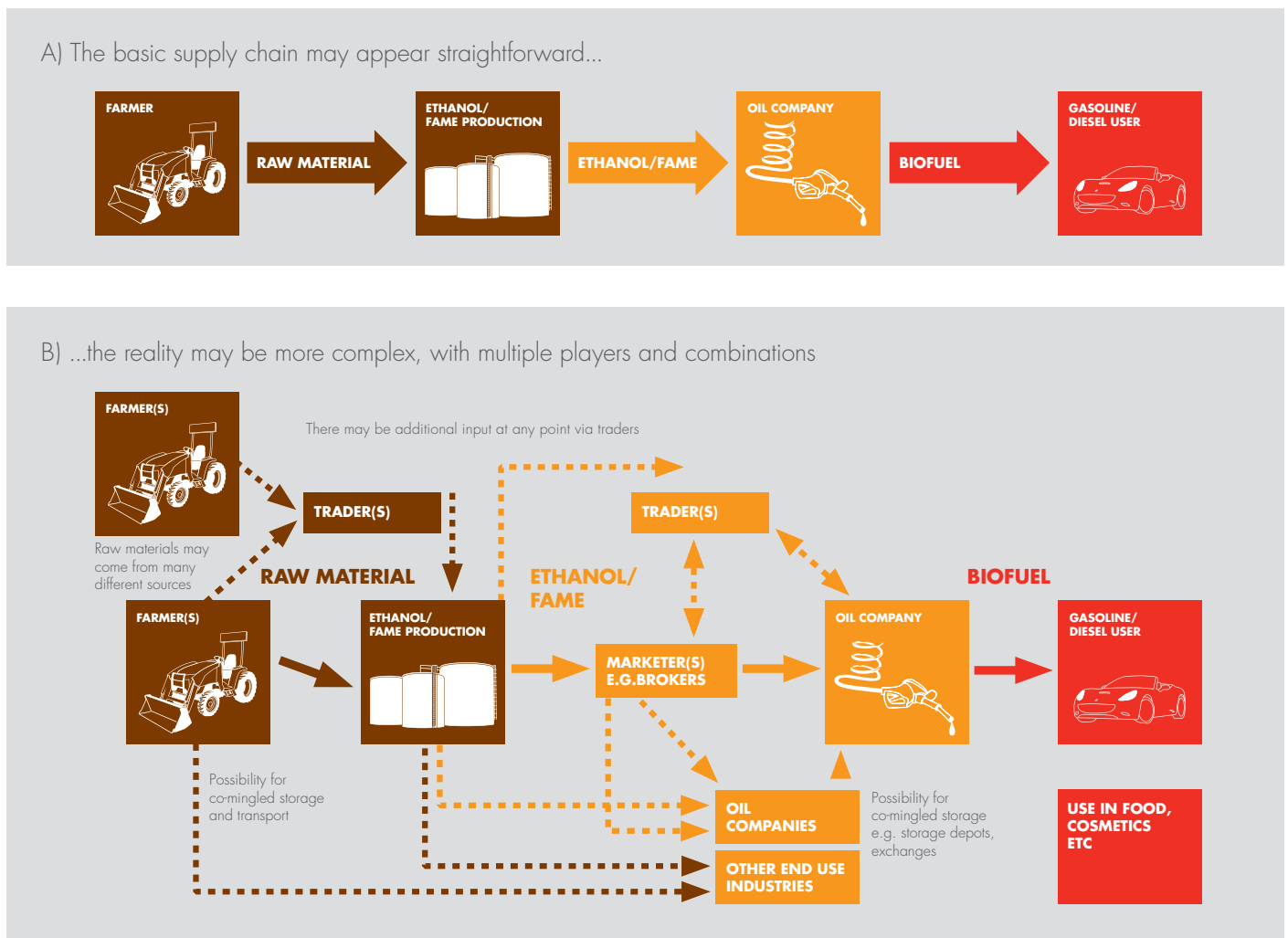
The second area is promoting CO<sub>2</sub> reduction and sustainability standards. Shell supports the adoption of well-to-wheel (WtW) CO<sub>2</sub> standards to reward more sustainable low CO<sub>2</sub> biofuels and disadvantage those that do not perform well in terms of CO<sub>2</sub> emissions. We are engaging industry, governments, intergovernmental agencies and policy makers to encourage sustainability

standards in the biofuels supply chain and working with environmental and social experts to help inform our strategy and share good practice.

The third area is working with others to progress industry knowledge. We are working with environmental and social experts to develop projects that help address potential direct and indirect impacts of biofuels production and to share experience and expertise.

**Figure 1:**

A complex supply chain







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**SHELL HAS BEEN CHAMPIONING  
SUSTAINABILITY STANDARDS IN OUR OWN  
BIOFUELS SUPPLY CHAIN FOR A NUMBER  
OF YEARS. //**

## CHAPTER 2:

# SUMMARY OF CARBON & SUSTAINABILITY DATA FOR 2010 / 2011 RTFO YEAR

This report represents Shell UK's summary of performance against the targets set by the Renewable Transport Fuels Obligation (RTFO) for 2010/2011. We have appointed Ernst & Young LLP to perform an independent assurance engagement in accordance with the International Federation of Accountants' International Standard for Assurance Engagements Other Than Audits or Reviews of Historical Financial Information (ISAE3000).

The traceability, completeness, consistency and accuracy criteria from the Renewable Fuels Agency (RFA) Verifiers Guidance have been used to evaluate Shell UK's application of the RFA's Technical Guidance for carbon and sustainability (C&S) reporting in the preparation of this report. The independent assurance statement is enclosed on page 10.

Shell UK is pleased to report on its performance in Year 3 of the RTFO. We have improved our performance in all targeted areas (data capture, environmental performance and GHG saving), although this year we fell slightly short of the ambitious Year 3 data capture target.

**Figure 2:**  
Summary of Biofuel Supplied

Feedstock	General		Environmental	Social	Carbon	
	% Fuel supplied by feedstock type (by volume)	% Data reported on biofuel characteristics	% Meeting Qualifying and/or RTFO standard	% Meeting Qualifying and/or RTFO standard	Average carbon intensity g CO <sub>2</sub> e / MJ	Average % GHG saving
<b>BIODIESEL</b>						
Soya beans	42.8	69.4	0.0	0.0	58.0	30.8
Used cooking oil	23.8	100.0	100.0	100.0	14.0	83.3
Tallow	15.4	100.0	100.0	100.0	17.0	79.7
Oilseed rape	14.5	82.3	0.0	0.0	52.0	37.9
Unknown	3.5	0.0	0.0	0.0	93.0	-11.0
<b>BIOETHANOL</b>						
Wheat	59.1	89.2	63.5	0.0	32.1	61.7
Corn (EC produced)	17.5	75.0	0.0	0.0	31.9	61.9
Barley	14.4	75.0	0.0	0.0	46.1	44.9
Molasses	3.6	100.0	100.0	100.0	61.0	27.2
Corn (Produced outside the EC)	2.5	50.0	0.0	0.0	62.0	26.0
Sugar beet	1.7	75.0	0.0	0.0	40.0	52.3
Sugar cane	0.9	100.0	100.0	100.0	24.0	71.4
Unknown	0.4	0.0	0.0	0.0	115.0	-37.2
Triticale	0.0	75.0	0.0	0.0	62.0	26.0
<b>WEIGHTED AVERAGE (ALL FUELS)</b>		<b>82.9</b>	<b>41.3</b>	<b>13.5</b>	<b>37.6</b>	<b>55.1</b>
<b>TARGET (2010/2011)</b>		<b>90.0</b>	<b>80.0</b>			<b>50.0</b>



**Figure 3:**  
Carbon & Sustainability Characteristics by Feedstock

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**Figure 3:**  
Carbon & Sustainability Characteristics by Feedstock (CONTINUED)

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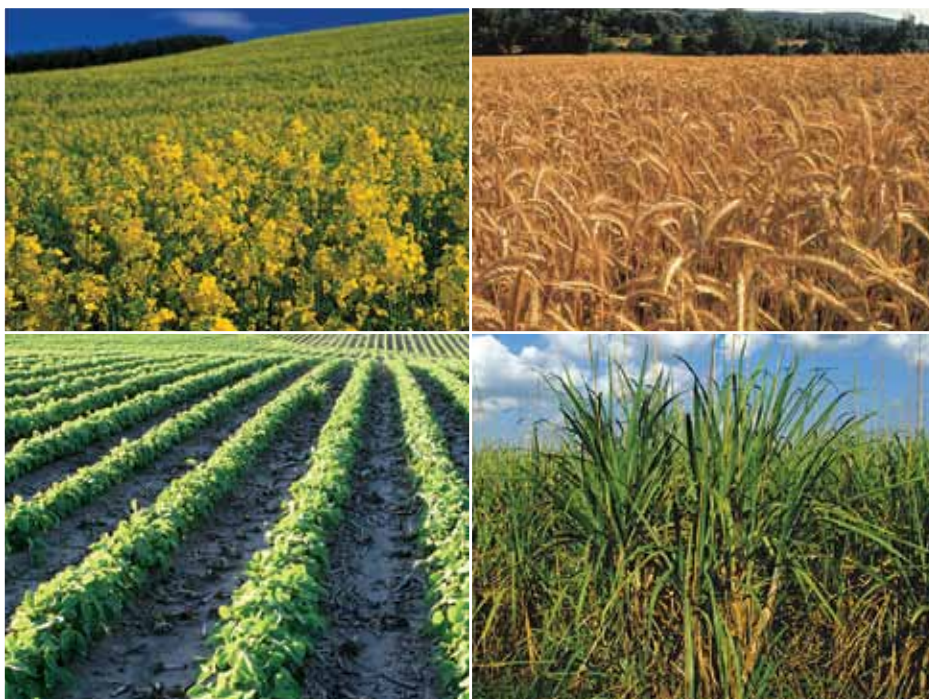
As shown in Figure 2, a range of feedstock was used, the most common of which was wheat from Europe used as an ethanol feedstock. We used more ethanol than FAME in Year 3. The majority of the feedstocks were from Europe (over 81%). Shell UK did not use any palm oil in Year 3.

We continue to support and encourage the various multistakeholder initiatives on sustainable production, including Bonsucro, the Roundtable for Responsible Soy (RTRS), the Roundtable for Sustainable Palm Oil (RSPO) and the Roundtable for Sustainable Biofuels (RSB). We are also active in standardisation bodies, such as CEN and ISO, which have and are developing harmonized approaches to sustainability for bioenergy. However, despite hard work in these areas, there remains very little certified sustainable biofuels available on the market (particularly for soy and sugarcane). The biggest change has been the introduction of other standards which are aiming to meet the EC's Renewable Energy Directive (RED) sustainability requirements primarily to support the German roll-out of the RED. European feedstocks have started to become certified against newer standards such as ISCC and Red-Cert. Unfortunately, these newer standards do not meet the more ambitious RTFO meta-standard criteria and can therefore not be considered as meeting the environmental criteria.

#### Figure 4:

##### Auditing

In 2010, we worked on assessing one of our Argentina soy supply chains against a range of different standards. We evaluated the supply chain against three different standards (RTRS, ISCC and RSB). Argentina has a complex and long supply chain and will be challenging to certify, particularly if only the biofuels users are requesting certification. We are hoping the animal feed users will start to support responsible soy and certification and then we expect to see more certified soy oil. The farmer group we worked with in Argentina was very professional and demonstrated reasonably sustainable production. There remain some challenges on the use of certain pesticides which are widely used in South America but are banned in Europe.





## ENVIRONMENTAL AND SOCIAL PERFORMANCE

There remains a shortage of available standards that meet the RTFO Qualifying Standard. As outlined in our Year 1 and Year 2 reports, we previously completed a small number of audits ourselves against the RTFO meta-standard to fill some gaps where standards did not exist. In Year 3, we did not continue with RTFO meta-standard auditing but relied more on existing standards. We have continued to be very active in supporting a number of the roundtable initiatives, in particular Bonsucro and the RTRS. We have seen the first certificates from these roundtables available on the market. However, these first certificates were book and claim so are not allowed to be used to meet European regulations.

## GREEN HOUSE GAS PERFORMANCE

We are pleased to have exceeded the GHG savings target for Year 3 of the RTFO. We improved GHG savings by increasing the use of feedstocks such as tallow, used cooking oil and UK wheat with actual CO<sub>2</sub> savings.

## DATA CAPTURE PERFORMANCE

We are disappointed that for the first time, we failed to meet the data capture performance target. We attribute this to the increased amount of ethanol used in Year 3 and the fact that the ethanol supply chain is still working on tracking all the data required.



A round-bottom flask containing a yellow liquid is being heated by a red mesh burner. The background is dark with horizontal lines.

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**SINCE 2007 WE HAVE INTRODUCED ENVIRONMENTAL AND SOCIAL SUSTAINABILITY CLAUSES INTO NEW AND RENEWED CONTRACTS FOR THE BIOFUELS THAT WE PURCHASE FOR BLENDING TO ENSURE THEY ARE NOT KNOWINGLY LINKED TO VIOLATION OF HUMAN RIGHTS OR CULTIVATED, PRODUCED OR MANUFACTURED IN AREAS OF HIGH BIODIVERSITY VALUE. //**



## CHAPTER 3: THE BIOFUELS SUPPLY CHAIN – ISSUES AND CHALLENGES

### INTERNAL GOVERNANCE

In Year 2 of the RTFO, Shell's reporting tool was upgraded to a database in partnership with an IT company strengthening governance and control of the data. Once the Renewable Energy Directive (RED) legislation becomes clear, this new tool will manage reporting for several member states, not only for UK.

### SHELL'S BIOFUELS SUPPLY CHAIN

We require suppliers to work with Shell to develop a more sustainable supply chain. We review their progress on a regular basis and reserve the right to conduct independent audits and cancel term supply contracts if it is established that the production of a biofuel has involved the violation of human rights, including child or forced labour, or the

clearing of areas with high biodiversity value. Shell reports on its performance compliance with this policy position in the annual Shell Sustainability Report.

Since 2007 we have introduced environmental and social sustainability clauses into new and renewed contracts for the biofuels that we purchase for blending to ensure they are not knowingly linked to violation of human rights or cultivated, produced or manufactured in areas of high biodiversity value. Shell's biofuels sustainability contract clauses are used for all long-term contracts except where the product is already certified as sustainable by a robust third party (e.g. Bonsucro (sugar cane), the Roundtable on Responsible Soy, the Roundtable on Sustainable Palm Oil and the Roundtable

on Sustainable Biofuels), or if the biofuel is certified sustainable by a European Commission approved voluntary scheme and the feedstock was grown in the EU, Canada or the US. Shell will conduct a risk assessment for any new bio component feedstock type/source country combination.

In recognition of sustainability concerns surrounding the use of palm oil for biofuels, Shell will only buy palm oil derived biofuels from suppliers that are certified by the RSPO and comply with its principles and standards, or have International Sustainability and Carbon Certification (ISCC) as recognized by the European Commission. (This does not apply to countries where RSPO certification is not yet in place such as Thailand.)





## PROMOTING STANDARDS FOR SUSTAINABILITY AND CO<sub>2</sub> REDUCTION

Shell supports the adoption of WtW CO<sub>2</sub> standards to reward low CO<sub>2</sub> biofuels and disadvantage those that do not perform well in terms of CO<sub>2</sub> emissions. Shell supports government schemes that encourage accurate and transparent reporting of biofuels performance, such as the UK's Renewable Transport Fuel Obligation carbon and sustainability reporting scheme. We are engaging industry, governments, intergovernmental agencies and policy makers to encourage sustainability standards in the biofuels supply chain and working with environmental and social experts to help inform our strategy and share good practice.

We are encouraging the adoption of international standards for sustainable sourcing and we participate in a number of initiatives that are working on voluntary guidelines and the development and roll out of certification standards for particular feedstocks. These include the Roundtable on Sustainable Biofuels (RSB), the Roundtable on Sustainable Palm Oil (RSPO), the Round Table on Responsibly Soy (RTRS) and BonSucro, formerly the Better Sugarcane Initiative (BSI).

We have pledged our support for an international multi-stakeholder coalition, which is seeking to enforce a moratorium on rainforest and peatland clearance associated with expansion of oil palm plantations in Southeast Asia.

In Europe, we have worked with the European Committee for Standardisation (CEN), which is developing sustainability requirements in support of the European Renewable Energy Directive and the European Fuel Quality Directive.



## WORKING WITH OTHERS TO PROGRESS INDUSTRY KNOWLEDGE

We are working with environmental and social experts to help to address potential direct and indirect impacts of biofuels production and to share experience and expertise.

We are building on our long-term collaborative partnership with the International Union for Conservation of Nature (IUCN) to exchange knowledge and expertise. IUCN's experience in managing species and ecosystems is helping us to address conservation and livelihood risks and opportunities in the decisions we take. As one of the world's largest distributors, Shell provides opportunities for IUCN to influence global markets towards more sustainable production processes.

Indirect Land Use Change (iLUC) is a complex concept which assumes that, in some cases, new crop production may displace existing activities creating indirect emissions elsewhere.

iLUC happens across the wider agricultural and forestry sector and it is associated with all end uses of agricultural production, not just biofuels alone. We believe that initiatives to tackle iLUC should therefore aim to mitigate CO<sub>2</sub> impacts from across all sectors. However, we recognise that iLUC can occur in association with biofuels production and that a reliable, well-evidenced solution is needed if Europe is to have a significant biofuels and bioenergy industry.

Growing evidence shows that iLUC risks can be mitigated or avoided altogether through a range of practices, such as the use of degraded land with no existing utility; yield enhancement; integration of biofuels production with other agricultural production systems; use of co-products and improvements to production or supply chain efficiencies. The effectiveness of some of these practices has been established by Ecofys, WWF and Conservation International in the Responsible Cultivation Areas report.

With other oil companies, and with technical input from environmental NGOs such as WWF and Conservation International, we are investigating ways to promote sustainable production of biofuels feedstocks on underutilised or marginal lands. These lands are areas that could be cultivated without negative environmental and social impacts and without pushing existing agricultural activities out to other areas. For example, they could be arable lands that have fallen into disuse and are away from areas of high biodiversity value.

In summary, we are pleased with our performance on carbon savings but we are working to ensure that the biofuels we procure for blending are produced in a more sustainable way. Looking forward, we expect the RED implementation in Europe will provide many opportunities to build on what has been achieved and to improve our performance.

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# INDEPENDENT ASSURANCE STATEMENT TO SHELL MANAGEMENT

The Shell UK 2010/2011 RTFO Annual Report (the Report) has been prepared by the management of Shell (UK) Oil Products Ltd. (Shell) who are responsible for the collection and presentation of the information within it. Our responsibility, in accordance with Shell management's instructions, is to carry out a limited assurance engagement on the carbon and sustainability (C&S) data contained within the Report. We do not, therefore, accept or assume any responsibility for any other purpose or to any other person or organisation. Any reliance any such third party may place on the Report is entirely at its own risk.

## WHAT DID WE DO TO FORM OUR CONCLUSIONS?

Our assurance engagement has been planned and performed in accordance with the International Federation of Accountants' International Standard for Assurance Engagements Other Than Audits or Reviews of Historical Financial Information (ISAE3000). The traceability, completeness, consistency and accuracy criteria from the Department for Transport (DfT) Verifiers Guidance<sup>1</sup> have been used to evaluate Shell's application of the DfT's Technical Guidance for C&S reporting<sup>2</sup> in the preparation of the Report. These criteria are as follows:

### Traceability

- Whether the C&S information in the Report is traceable back to the party or parties that generated the original source information?
- Whether sufficient and appropriate evidence is available to support all C&S information within the Report?

### Completeness

- Whether C&S information has been provided for each administrative batch?
- Whether the Report reflects all administrative batches of fuel reported on the DfT Operating System (ROS)?

### Consistency

- Whether reported feedstock types for biofuel blends are representative of actual feedstock types for the fuel supplied?

### Accuracy

- Whether the C&S data in the Report has been accurately collated and reported?

In order to form our conclusions we undertook the steps outlined below:

1. Interviewed Shell personnel in the UK and Netherlands with responsibilities for managing, collating and reviewing C&S data on the biofuels supplied by Shell into the UK, and for reporting C&S data to the RFA.

2. Reviewed relevant documentation and examined the systems and databases used by Shell in the UK and Netherlands for managing and reporting C&S data.
3. Examined the evidence held by Shell to support the C&S data being reported to the RFA.
4. Performed a desktop review of selected biofuels suppliers to examine the evidence held to support the C&S information provided to Shell during the RTFO obligation period.
5. Reviewed Shell's RTFO annual report for appropriate presentation of the C&S data, including qualitative descriptions of Shell's performance during the obligation period.

### Level of assurance

Our evidence gathering procedures have been designed to obtain a sufficient level of evidence to provide a limited level of assurance in accordance with ISAE3000.

### Limitations of our review

Our scope of work was limited to the RTFO carbon and sustainability data contained within Shell's 2010/2011 RTFO Annual Report.

<sup>1</sup> RFA Guidance for Verifiers v3.0 dated March 2011

<sup>2</sup> Carbon and Sustainability Reporting within the Renewable Transport Fuels Obligation  
– Technical Guidance Part 1 v3.4 dated May 2011 and Technical Guidance Part 2 v3.1 dated April 2010



## OUR CONCLUSIONS

Based on our review:

- We are not aware of any C&S information contained within the Report which is not traceable back to the party or parties that generated that information.
- We are not aware of any C&S information contained within the Report which is not supported by sufficient and appropriate evidence.
- We are not aware of any biofuels supplied by Shell into the UK market during the RTFO period which have been excluded from the scope of the Report.
- We are not aware of any collation or reporting errors that would materially affect the C&S information contained within the Report.

## OUR OBSERVATIONS

Our observations and areas for improvement will be raised in a report to Shell's management. Selected observations are provided below. These observations do not affect our conclusions on the Report set out above.

- During our testing of Shell's internal data systems we identified a number of discrepancies which have been corrected. These discrepancies were mainly as a result of difficulties in obtaining timely C&S data from Shell's trading businesses who buy and sell biofuels. Shell is in the process of introducing a new information system to strengthen C&S data management. This should help minimise the risk associated with delays in C&S data in the future.
- Shell continues to engage actively with its supply base on biofuels sustainability related matters. Whilst this engagement has provided a good basis for improving traceability through its supply chain, our review has highlighted that not all suppliers are able to provide the required evidence of traceability. This is therefore an area where Shell should continue to focus in its engagement with suppliers.

## OUR INDEPENDENCE

This is the third year Ernst & Young LLP has provided independent assurance services in relation to Shell's C&S reporting under the RTFO. With the exception of this work we have provided no other services relating to the preparation of Shell's C&S reporting under the RTFO.

### Our assurance team

Our assurance team has been drawn from our UK Climate Change and Sustainability Services team, which undertakes similar engagements to this with a number of significant UK and international businesses.

### Ernst & Young LLP

London  
28 September 2011