

Shell and Biofuels:

Finding a sustainable way forward





INTRODUCTION

THE ENERGY CHALLENGE

In coming decades, the world will need huge amounts of energy to support economic growth and reduce poverty. Supplies of conventional energy will struggle to keep up with growth in demand. And energy needs to be produced in environmentally and socially responsible ways, especially in dealing with greenhouse gas emissions. This is the energy challenge. Meeting it is fast becoming one of the defining tests facing society.

BIOFUELS AS AN ADDITIONAL FUEL OPTION

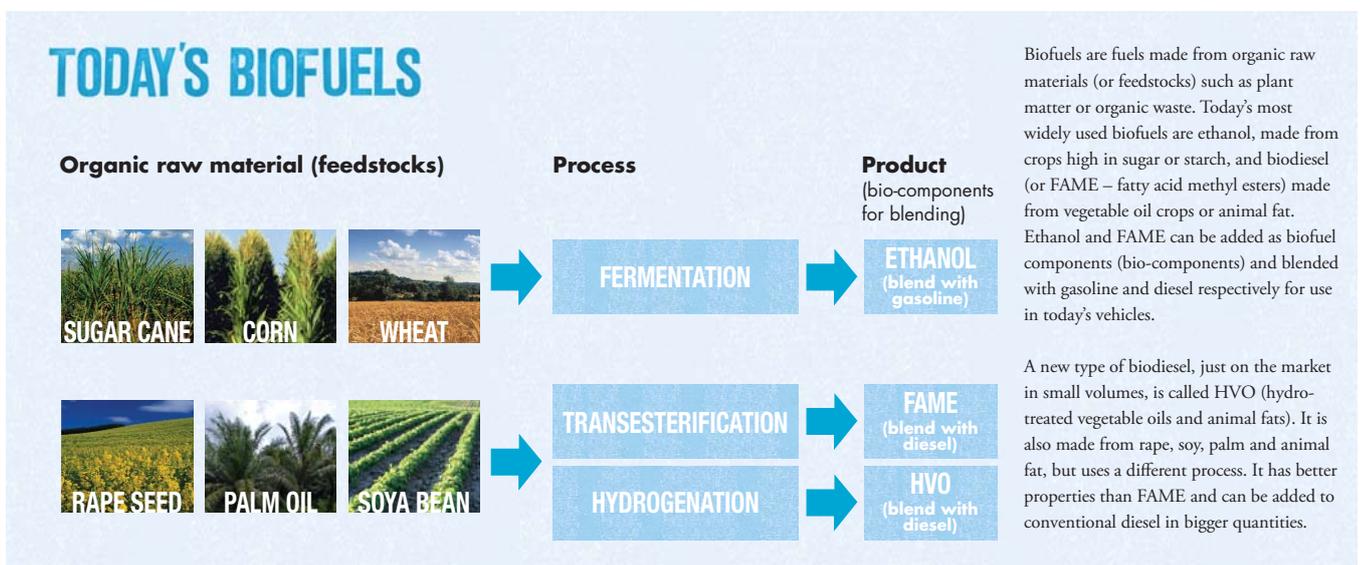
Biofuels could help meet the energy challenge, especially by reducing carbon dioxide (CO₂) emissions from the transport sector. Cars and trucks account for about 17%^a of energy-related CO₂ emissions. The number of vehicles on the road could increase to more than two billion by 2050^b. And despite the future promise of electric and hydrogen-powered cars, a large proportion of those vehicles will require liquid fuels. Biofuels offer a low-carbon alternative to conventional gasoline and diesel. Various types of ethanol and biodiesel are blended in some markets today – usually in low levels of 5–10%. And better biofuels – with a lower carbon footprint, more sustainable raw materials and higher performance – are around the corner.

GOVERNMENT POLICY AND TARGETS

Many governments are supporting the development of biofuels with mandated targets for renewable transport fuels. The European Union, for example, is currently considering the Renewable Energy Directive which proposes that 10% (energy basis) of road vehicle fuel should come from renewable sources by 2020. In the USA, the Energy Independence and Security Act 2007 requires 36 billion gallons of renewable road transport fuels by 2022. More than 40 countries either have or are considering renewable fuels mandates.

SUSTAINABILITY CHALLENGES

But biofuels are no silver bullet and both policy makers and producers need to address a range of issues associated with their use. For example, the CO₂ performance of biofuels can vary widely depending on the raw materials and the production and processing techniques used. Biofuels can also compete with food crops for available land. And the cultivation of biofuels feedstocks can – if not managed well – result in the destruction of valuable forests, displacement of local communities, abuses of workers' rights and unnecessary waste of water.



^a International Energy Agency, World Energy Outlook (2005).

^b World Business Council for Sustainable Development, Energy & Climate Change Facts & Trends to 2050 (2004).

SHELL AND BIOFUELS

A LEADER IN BIOFUELS EXPERIENCE

Shell currently buys, trades, stores, blends and distributes biofuels. In 2007, we distributed over five billion litres of transport biofuels – mainly to comply with government mandates – making us one of the world's largest distributors.

We have a 30-year history of biofuel research, development and investment. Our biofuels research and technology team today works out of centres of excellence in India, the Netherlands, the UK and the USA. And we have partnerships with private technology firms and research agreements with leading institutions, including in Brazil and China.

OUR BIOFUELS STRATEGY

We believe biofuels could grow from just 1% of the world's transport fuel mix today to as much as 7–10% over the next few decades. Last year, we quadrupled our rate of investment in biofuels and aim to build a significant biofuels business in the next 10 years.

We are building our capacity in today's biofuels – partly to meet government mandates, but also to help us develop the know-how and market leadership needed to introduce next-generation biofuels that use more sustainable feedstocks (like straw, wood or even algae) and emit even less CO₂.

We think commercial volumes of next-generation biofuels could be on the market in five to 10 years. To get there, we are investing in partnerships (see box) targeted at technical breakthroughs and cost-reducing innovations. We are also working with non governmental organisations (NGOs), policy makers and industry coalitions to develop and promote robust global standards for ensuring the sustainability of biofuels production.

But we are also working to ensure that the feedstocks and conversion processes for the biofuels we purchase today are as sustainable as possible. For example, we are introducing environmental and social safeguards into contracts for the bio-components that we purchase for blending and will be tracking the performance of our suppliers against these.

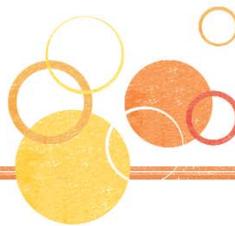
The work we are doing to source today's biofuels sustainably is outlined on pages 3–5. More details on our investments in tomorrow's biofuels can be found at www.shell.com/biofuels



OUR BIOFUELS EXPERIENCE

- Buy, trade, store, blend and distribute biofuels.
- One of the world's largest distributors of today's transport biofuels.
- Research with experts in academic institutions across the world.
- Technical partnerships with the world's leading biotechnology companies:
 - Iogen: cellulosic ethanol from straw
 - CHOREN: synthetic diesel from woodchips
 - Codexis: building better conversion enzymes
 - Cellana: growing algae for vegetable oil
 - Virent: converting plant sugars directly into gasoline.

OUR APPROACH TO SUSTAINABLE SOURCING



THREE AREAS OF FOCUS

We are working to ensure that the bio-components we purchase for blending are produced in a more sustainable way – safeguarding the environment and delivering benefits to society. Our approach has three areas of focus (see figure) reflecting our differing spheres of influence.

The first area is our own **internal governance**. We now have systems, policies and resources in place to help us assess potential sustainability risks in our biofuel supply chain, to implement controls and to monitor and report progress.

The second area is engaging **our suppliers** of bio-components – who in turn, work closely with the farmers and other cultivators – to create awareness about sustainable sourcing and to implement environmental and social safeguards into our supply chain. This includes introducing sustainability clauses into new and renewed contracts. The supply chain for biofuels can be long and complex. For Shell and other companies towards the end of the chain, assessing whether there are effective controls throughout can be a major challenge (page 6), but one we are determined to address.

The third area is our efforts to influence the **wider industry** and raise sustainability standards. The oil industry represents a small percentage of the world's overall use of biofuel raw materials. Biodiesel, for example, today accounts for less than 10%^a of the global vegetable oils market: the food and cosmetic industries account for the majority of demand and will continue to do so. It is clear that the sustainability challenges related to biofuel production cannot be tackled alone. So we are playing a leading role, working with other industries, such as food and cosmetics, governments and NGOs to raise standards and improve practices across the feedstock industry. This includes participating in several multi-stakeholder initiatives to develop international sustainability standards. We are also working with NGOs and other experts to develop projects to help address the potential direct and indirect impacts of biofuel production and to share experience and expertise.

Our progress in each of these areas is discussed on pages 4–5.



OUR APPROACH AND SPHERE OF INFLUENCE

3. WIDER INDUSTRY

- Engagement and advocacy to raise sustainability standards and improve practices
- Collaboration to address potential impacts and enhance opportunities
- Sharing experience and expertise

2. OUR SUPPLIERS

- Create awareness about sustainable sourcing
- Incorporate sustainability safeguards into the supply chain

1. SHELL

- Internal governance

^a Based on figures from Oil World and PIRA.

OUR PROGRESS...

INTERNAL GOVERNANCE

We have introduced rules and practices to help assess potential sustainability risks in our biofuel supply chain, implement controls, monitor compliance and report our progress.

In 2006, we established a Biofuels Sustainability Team to develop and implement a strategy for sustainable sourcing of bio-components. The team reports to a Steering Committee of senior executives. More recently, we appointed a dedicated Biofuels Sustainability Compliance Officer to oversee and coordinate implementation.

Policy statement – In August 2007, we issued a Policy Statement for the Sustainable Sourcing of Biofuel Components. This explains our position and outlines our commitments to work with governments, suppliers and others, and to publicly report our progress. In particular, we have pledged to work with our suppliers to incorporate

sustainability clauses into supply contracts (see box opposite). We have started to develop and implement tracking systems to record information about the sourcing of the bio-components we purchase. We reported to the UK government on biofuels as part of the Renewable Transport Fuels Obligation (RTFO), which requires fuel suppliers to submit monthly reports on the carbon emission savings and sustainability of biofuels. According to the RTFO's first interim quarterly report (October 2008)^a, Shell reported one of the highest levels of data capture and was the only oil major to exceed the target for carbon savings. We have also developed tools, including a supply chain questionnaire, to help us assess potential risks before we decide whether to enter into new contracts.

Independent assurance – In addition to our own internal checks, our policy requires us to seek independent audit of our processes in line with internationally recognised social and environmental auditing

ENGAGING OUR SUPPLIERS

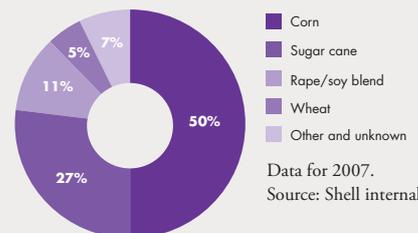
Since September 2007, we have issued our sustainable sourcing policy to bio-component suppliers and included sustainability clauses in new and renewed term contracts.

We recognise that some suppliers may not meet our expectations in full right away but, if they wish to supply Shell, they must commit to work with us to develop a more sustainable supply chain. We will review their progress on a regular basis and reserve the right to conduct independent audits and to terminate contracts.

Our supply chain – We purchase bio-components for blending globally from approximately 100 suppliers. Most of these bio-components are used for blending with gasoline (over 80% in 2007), the rest being used for diesel. According to our internal records,

three-quarters of the bio-components we purchased in 2007 were produced from just two raw materials: corn (from the USA) and sugar cane (mostly from Brazil).

RAW MATERIALS USED TO MAKE BIOFUEL COMPONENTS PURCHASED BY SHELL



RAISING INDUSTRY STANDARDS

We are engaging industry, governments, intergovernmental agencies and policy makers to encourage sustainability standards in the biofuels supply chain and we are working with environmental and social experts to help inform our strategy and share good practice.

Advocacy – We believe that governments should encourage and reward bio-components that are produced from sustainable sources. We think CO₂ performance of biofuels should be rewarded as well. A single robust and transparent approach for calculating the well-to-wheels carbon intensity of fuels is needed, based on sound science and developed in consultation with industry.

We are encouraging the adoption of international standards for sustainable sourcing and we participate in several initiatives that are working on voluntary guidelines for particular raw materials. These include the Roundtable on Sustainable Biofuels (RSB – of which we are a Steering Board member), the Roundtable on Sustainable Palm Oil (RSPO), the Round Table on Responsible Soy (RTRS) and the Better Sugarcane Initiative (BSI). While the RTRS and the RSB have now published draft standards for comment, the RSPO is the first commodity-specific initiative to publish a standard and have an operational certification scheme. In support of this, as part of our contract sustainability clauses, we require any supplier that wishes to supply palm oil to Shell to join the RSPO and comply with its principles and standard.

^a Report available at www.dft.gov.uk/rfa

principles. This is an evolving area for sustainability of biofuels and one in which we are determined to play a leading role.

We have appointed KPMG (who have international experience in sustainability assurance) and ProForest (a consultancy that specialises in practical approaches to sustainability) to provide us with technical advice as we develop a sustainability assurance programme for our biofuel activities. This programme will provide an independent risk-based examination of our suppliers and enable us to assess whether they are complying with our sustainability contract clauses and emerging regulatory requirements (for example, the UK's RTFO). The programme will also help us to identify good practices to improve our performance. We will conduct trial supply chain audits before the end of 2008. Lessons from these will help us develop a global programme, with the aim in the future of having our performance independently assured.

OUR SUSTAINABILITY CLAUSES

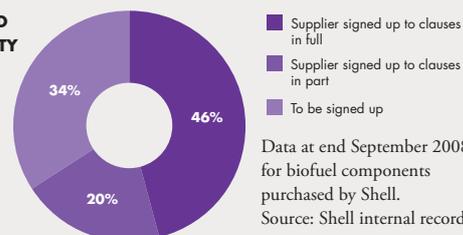
Our sustainability contract clauses require suppliers to seek to ensure that:

- bio-components and feedstocks are not knowingly linked to the violation of human rights (child or forced labour) and have not knowingly been cultivated, produced or manufactured in areas of high biodiversity value
- suppliers develop and implement supply chain traceability systems
- suppliers join relevant international bodies developing sustainability criteria for the production of particular feedstocks.

Sign up to sustainability clauses – By the end of September 2008, 46% of the bio-components we purchased, by volume, were from suppliers who have signed up in full to our sustainability clauses. We purchased a further 20% from suppliers who have partially adopted our clauses and are moving towards full implementation. This means that 66% of the bio-components we purchased, by volume, at the end of September 2008, were covered in some form by our contractual sustainability clauses.

We will continue to increase the number of our contracts that include sustainability clauses. We recognise that there are many issues and challenges which can make it difficult for suppliers to comply (page 6), but we are committed to working with them to improve their sustainability performance.

VOLUME OF BIOFUEL COMPONENTS COVERED BY SHELL SUSTAINABILITY CLAUSES



Through expert representation on national standards bodies, we are also supporting the work of the European Committee for Standardization (CEN), which is developing sustainability requirements in support of the development of the European Renewable Energy Directive and the Fuel Quality Directive.

Working with others – We are working with environmental and social experts to develop projects that help address potential direct and indirect impacts of biofuel production and to share experience and expertise. For example, 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. Our role in global biofuels markets, as one of the world's largest distributors,

provides opportunities for IUCN to influence global markets towards more sustainable production processes.

Together with other oil companies, and with technical input from environmental NGOs, we are planning to investigate ways to identify 'idle lands' that could be used for the sustainable production of biofuel feedstocks. These 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.

We recently 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.

THE BIOFUELS SUPPLY CHAIN

ISSUES AND CHALLENGES

LONG AND COMPLEX SUPPLY CHAINS

Shell and other companies that only blend and distribute finished biofuels can find it difficult to assess whether there are effective controls throughout surprisingly long and complex supply chains (see figure below). Some bio-component suppliers simply market them, while others work across the whole supply chain. And the chain may span the globe: bio-components purchased in one country may come originally from another. For biodiesel, the chain becomes even more complex because production involves additional steps such as seed crushing.

LIMITED SOURCE INFORMATION

Bio-components can be purchased under 'term' contracts – an agreement with a supplier to purchase regular quantities for a defined period of time – or under 'spot' contracts. Spot contracts are one-off purchases, handy to meet shortfalls and short-term spikes in demand. But in many regions, information about spot market purchases can be sketchy at best; it is hard to know where the bio-component was made, by whom and under what environmental and social conditions.

TRACEABILITY

Like most commodities, bio-components from different sources may be mixed together during storage and transportation at any point along the supply chain. This can make it very difficult to trace the origin and verify the environmental and social conditions under which the bio-component was made.

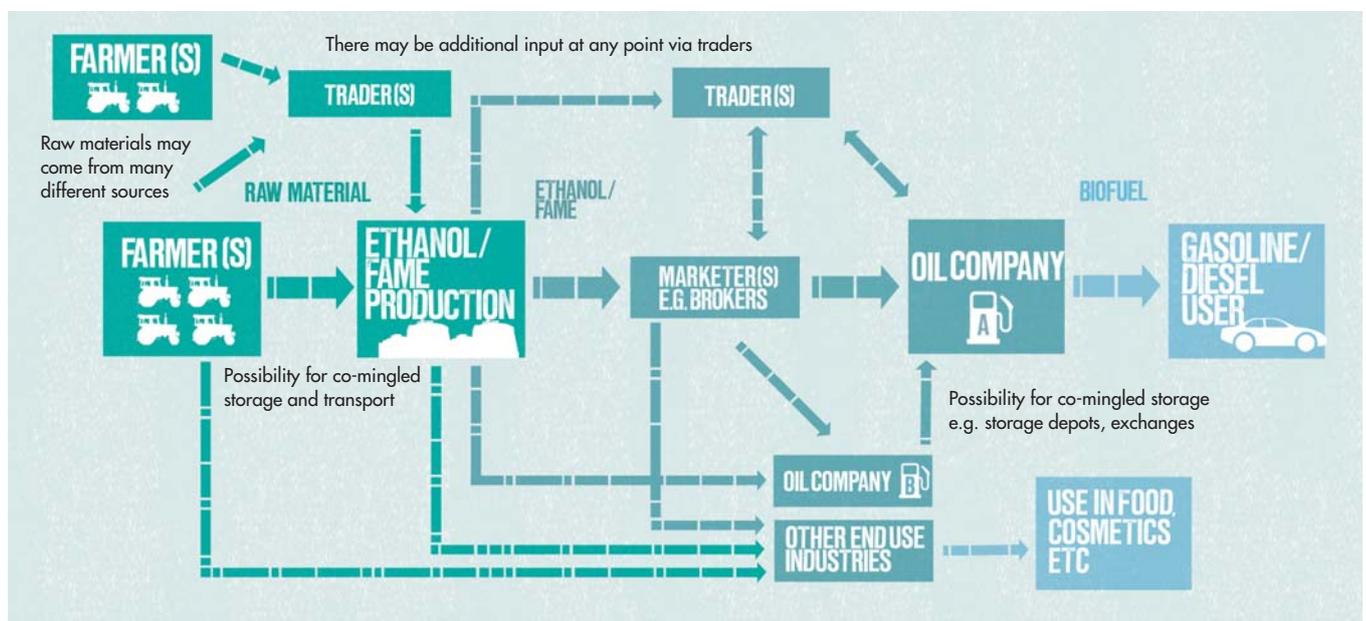
MANY OTHER END USES

Bio-component raw materials are used to produce many different products – not just biofuels. To improve the sustainability of supply chains, it is vital that all end-use industries are involved.

A) The basic supply chain may appear straightforward...



B)...the reality may be more complex, with multiple players and combinations



NEXT STEPS

Our priorities moving forward are:

INTERNAL GOVERNANCE

Further developing our compliance and reporting programme.

By the end of 2008, we aim to complete our research and pilot supply chain audits that will form the basis for the design of a global assurance programme covering our biofuel activities. We intend to report our progress with this programme in our annual Shell Sustainability Report. In time, this will include independently assured performance covering supplier compliance with our sustainability contract clauses.

Evolving our policy and clauses in line with feedback and experience. We are improving the wording of our sustainability contract clauses to reflect feedback received from our suppliers and other stakeholders. We will also update our policy as international sustainability standards continue to evolve and as we continue to engage suppliers.

ENGAGING OUR SUPPLIERS

Increasing supplier sign up to our clauses. We will continue to engage our suppliers to bring contracts in line with our policy. We are

providing detailed advice and location-specific information to help more of them to sign up to our clauses. We will assess our remaining contracts and prioritise action based on potential risks. Factors such as government policies and mandates, evolving international and sector standards, availability of certified bio-components and supply chain complexity will determine the timeline for full implementation.

RAISING INDUSTRY STANDARDS

Playing an active role in helping to formulate sustainability standards that cover all major raw materials. We will continue to work with industry, governments and NGOs to raise sustainability standards across the feedstock industry by participating in multi-stakeholder initiatives such as the roundtables and country and regional standardisation bodies. The ultimate aim is to develop a harmonised and widely-accepted system to assure the sustainability of all major biofuel raw materials.

Working with others. We will continue to work with environmental and social experts to help address potential direct and indirect impacts of biofuel production and to identify ways to enhance potential opportunities, for example, for small-scale producers.

MORE INFORMATION

For more details on Shell and biofuels, visit www.shell.com/biofuels

Other useful sources of information

Roundtable on Sustainable Biofuels

<http://energycenter.epfl.ch/biofuels>

Roundtable on Sustainable Palm Oil

<http://www.rspo.org>

Round Table on Responsible Soy

<http://www.responsiblesoy.org>

Better Sugarcane Initiative

<http://www.bettersugarcane.org>

Legal disclaimer – The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this report, the expression “Shell” is sometimes used for convenience where references are made to companies within the Shell group or to the group in general. Likewise, the words “we”, “us” and “our” are also used to refer to Shell companies in general or those who work for them. These expressions are also used where no useful purpose is served by identifying specific companies.
Date of publication – November 2008, version 1.