Promoting Sustainable Bioenergy Production and Trade



EU Support for Biofuels and Bioenergy, Environmental Sustainability Criteria, and Trade Policy

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ICTSD Global Platform on Climate Change, Trade Policies and Sustainable Energy

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International Centre for Trade and Sustainable Development

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ICTSD welcomes feedback and comments on this document. These can be forwarded to Marie Chamay, mchamay@ictsd.ch.

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ABBREVIATIONS AND ACRONYMS

AMS	aggregate measurement of support
BSI	British Standards Institution
CAP	Common Agricultural Policy
CEN	European Committee for Standardization (Comité Européen de Normalisation)
CHP	combined heat and power
EBB	European Biodiesel Board
ECOFIN	EU Economic and Financial Affairs grouping of the Council of Ministers
ECX	European Climate Exchange
EPA	economic partnership agreement
EU	European Union
GATT	General Agreement on Tariffs and Trade
GSP	Generalized System of Preferences
ktoe	1000 tonnes of oil equivalent
LEADER	Liaison Entre Actions pour le Developpement de L'Economie Rurale
MFN	most favoured nation
MWh	megawatt hour
NGO	non-governmental organization
Ofgem	UK Office of Gas and Electricity Markets
Relu	Rural Economy and Land Use
RO	renewables obligation
ROC	renewable obligation certificate (originally issued for each 1 MWh of electricity generated from renewable sources)
RTFO	renewable transport fuel obligation
RTFOC	renewable transport fuel obligation certificate
SCM	Subsidies and Countervailing Measures
SPS	Single Payment Scheme
TOE	tonnes of oil equivalent
UK	United Kingdom of Great Britain and Northern Ireland
US/USA	United States (of America)
USDA	United States Department of Agriculture
WTO	World Trade Organization

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FOREWORD

To produce, trade on or use agricultural products as fuel—a practice as old as human history—has become a policy riddle spawning emotional debate and multiple, sometimes competing and conflicting, measures and actions. Today, many see fuel derivatives from agricultural produce and forests as a new frontier in energy supply. In a context of action against climate change, the carbon emissions efficiency of some energy crops has emerged as a promising, powerful alternative to the use of fossil fuels. Against a backdrop of energy scarcity, particularly in cash-dry economies, excitement on the prospect of producing cheap fuels from un-edible crops at large scale seems unarguable. Especially if crops are grown on marginal lands, if new policies both at home and abroad are generating fresh capital and investment flows, and if, on top, energy resulting may match otherwise unattended demand and neglected populations.

A promissory outlook, except that at this very time, successfully steering action on agrofuels as a tactic in combating climate change, or as energy or developmental strategy, is complicated by critical factors; primarily, a lack of consensus on how to deal with the emerging flows of trade and investment and the ensuing trade-offs in the allocation of implicated resources, from land, to work force, to capital. Compounding the issue are ill-equipped existing regulatory frameworks at both domestic and international levels. And, equally crippling is perceived deficiency in science and metrics to demonstrate effects. Not insignificant is the realization that current technologies limitations of scale render the whole idea less attractive or, at best, relegate its relevance to a niche use.

Yet, OECD countries and most major demandeurs of energy for transport or otherwise, have in the past few years adopted policies and measures that have spurred enormous demand and stimulated investment in production and growth. Evidence shows that these policies have created or significantly and rapidly expanded trade flows and production at home and abroad; in particular measures introducing mandates of agrofuel use in the mix of liquid fuel for transportation or the energy grid. Activity on technological development has also surged in recent years in response to prospects and stimuli; indeed, high expectation of an eventual technological fix to the shortcomings of existing possibilities for ethanol and bio-diesel, specifically in the use of biotechnology in the conversion of cellulose fibres into energy, has served in contradictory ways as both incentive or deterrent for further development of existing feedstock. The fact is that given that energy crops are based on the basic conversion of sunlight into energy by means of plants, natural comparative advantages rest for the moment in tropical crops; a key factor determining the current geography of production and trade. However, technological applications at advanced stages of development may soon alter all this and with it, the accompanying political economy orbiting policy-making.

Net gains and losses from use of biomass as energy are hard to estimate, particularly in a long-term assessment. Odds for a future of improved energy efficiency, lower carbon emissions, reasonable and sustainable use of lands for the production of food, fibre, forests or fuel, and larger developmental and social gains, may be enhanced or doomed by options on policy made now; especially those aiming at long term targets and changes and regulatory frameworks in the form of international rules that limit and lock-in our possibilities.

It is in this context that ICTSD has decided in the past two years to engage in policy dialogue, research and analysis and problem-solving activity that contribute to societies' very pressing and real need to come to grips with the reality of energy crops. We do so, conscious of the dynamism of the policy environment, together with the intended and unintended consequences of policy

development; the actual impact of decisions on use of resources in the daily lives of communities and individuals, even if on trial or temporarily terms, and the need to find solutions from the policy perspective that are durable and supportive of the sustainable aspirations of societies and global welfare.

The issue paper you are holding, authored by Alan Swinbank, provides policy-relevant analysis of EU policies driving biofuels production within and outside the EU and their implications for trade policy. It is part of ICTSD's project on Promoting Sustainable Bioenergy Production and Trade, published under its Programme on Agricultural Trade and Sustainable Development, which seeks to promote food security, equity and environmental sustainability in agricultural trade.

This paper incorporates material previously presented at Agra Informa's biannual seminar on the common agricultural policy (CAP), and assembled for a research project on Integrated systems for farm diversification into energy production by anaerobic digestion: implications for rural development, land use and the environment funded by the UK Research Councils under the Rural Economy and Land Use (Relu) programme, involving colleagues in the Centre for Agricultural Strategy at the University of Reading, and at the University of Southampton. Alan Swinbank is grateful to the Economic and Social Research Council for funding, and to his colleagues in Southampton and Reading for their forbearance in the recycling of material here. The report was written in parallel with a Presidential Address for the Agricultural Economics Society, entitled EU Policies on Bioenergy and their Potential Clash with the WTO, for presentation at the Society's annual conference in Dublin in spring 2009.

Although we asked specifically for a report on biofuels, it is important to set this in the more general context of EU policy on bioenergy, and this paper does so. The EU is seeking to lay down mandatory targets for the use of renewable energy and biofuels, but it is largely the responsibility of the Member States to deliver on these. They are using a variety of policy mechanisms and incentives; and as it would be a major undertaking to detail the policies of all 27 Member States this report focuses on the United Kingdom.

The paper does not attempt to disentangle the science behind the policy response, the technologies deployed, or the economics of bioenergy production.

The ICTSD teams involved in these fascinating issues and myself, very much hope that this paper is of interest and, indeed, a contribution to the current debate and the definition of policy options.

Thank you,

Ricardo Meléndez-Ortiz
Chief Executive, ICTSD

EXECUTIVE SUMMARY

Although undoubtedly influenced by concerns about security of energy supplies, and a wish to find alternative market outlets for European farmers, the EU's policy for biofuels (defined in EU legislation as liquid and gaseous fuels for transport use) is associated closely with its more generic policies to promote bioenergy, which in legislative terms is embedded in its policy on renewable energy, part of its strategy to reduce greenhouse gas emissions.

The EU's strategy, and its implementation by the Member States, has been evolving for a number of years; but its current ambition is that by 2020 some 20 percent of its primary energy supplies should come from renewable resources (including bioenergy) and that, in each Member State, renewables (largely biofuels) should provide 10 percent of energy use for transport. It is up to the Member States to deliver on these obligations, in the framework of EU rules.

In the UK, for example, which will be required to source 15 percent of its primary energy from renewables by 2020, there is a renewables obligation (RO) imposed on electricity suppliers. Failure to meet the obligation results in a financial penalty; it is this RO that is providing farmers with financial incentives to plant *Miscanthus* and other material suitable for burning in electricity-generating power stations.

For transport, biofuels in the UK pay a reduced road fuel tax, and a renewable transport fuel obligation (RTFO) obligates suppliers of petrol and diesel to incorporate set percentages of biofuels in their aggregate supplies. Throughout Europe, biodiesel is a much more important biofuel than is bioethanol.

Various investment grants are also available to further encourage the uptake of these new technologies. The EU's rural development regulation, part of its CAP, provides for various forms of on-farm and rural investment. Other CAP provisions are rather irrelevant, as the limited Energy Crops Scheme was abolished in the Health Check reforms agreed in November 2008.

Imports of bioethanol face a high import tariff, but most bioethanol is imported at a zero rate from developing countries through super-GSP (Generalized System of Preferences), Everything but Arms and (what was) the Cotonou Convention. Apart from imports of biodiesel from the United States of America (USA) (a contested trade), imports of vegetable oils supply the biodiesel market. Because the EU offers financial incentives to use biofuels that are not matched by similar incentives in supplier countries, the EU's imports of biofuels (and of vegetable oils for blending as biodiesel) are probably larger than they would otherwise be.

The UK's policies to support the use of biofuels would not appear to be problematic under the World Trade Organization (WTO) Agreement on Subsidies and Countervailing Measures (the SCM Agreement). They would not appear to be prohibited subsidies, because they are not paid on exports but they are paid on imports. Nor would they appear to be actionable: the alleged "harm" they impose on other countries is to raise world food commodity prices (not an issue addressed by the SCM Agreement) rather than cause harm to overseas suppliers. Under the Agreement on Agriculture, they potentially would be declarable as amber box policies, but the impact would be slight. Biodiesel is not covered by this agreement; there is no market price support within the meaning of the agreement; and the financial benefit conferred on suppliers of material for bioethanol production is limited (and difficult to determine). However, if the EU were to declare all of its taxpayer- and consumer-funded biofuel subsidies as amber box support, then this would form a substantial proportion of its aggregate

measurement of support (AMS) entitlement, which would be problematic following a successful outcome to the Doha Round.

The real problem in the WTO is the EU's plan to impose environmental sustainability criteria on biofuels if they are to contribute to renewables mandates and benefit from EU support programmes.

The EU's plans for environmental sustainability criteria could be challenged in the WTO, and they will be defended successfully only if the EU can show that they are non-discriminatory and scientifically based and that they have been imposed only after meaningful negotiations, with the EU's main suppliers, to develop international standards.

1. INTRODUCTION

As elsewhere, the motives driving the EU's use of, and policy towards, biofuels (and bioenergy more generally) are complex and multifaceted. Concerns about the price of energy derived from fossil fuels has some part to play in the commercial interest shown in bioenergy, but oil prices alone are not really sufficient to drive commercial operators to invest heavily in new bioenergy installations. The European industry exists mainly because of policy incentives.

The two explicit policy drivers are (i) a concern about energy security, which has been to the fore in the US, and (ii) as part of an effort to reduce carbon emissions to combat global warming, which has tended to dominate the European initiatives. There is also, undoubtedly, an agricultural or rural development interest: if an additional outlet for farm products can be found, then this could boost farm incomes, generate new jobs in rural areas, and reduce the dependence of the agricultural sector on the existing policy mechanisms under the CAP.

European environmental legislation limiting, for example, the use of landfill for waste disposal and the release of animal slurries in nitrate-sensitive areas, can also encourage the production of bioenergy (particularly biogas). Because of the restrictions on landfill, local governments, businesses and others producing "waste" biomass (e.g. from households and food-processing plants) are now willing to pay a "gate fee" to dispose of waste to operators, who will then use it to generate power or produce biogas.

1.1 The products and technologies

There is a vast array of technologies and products, but for our discussion of EU policy on bioenergy we consider three main types:

- "Woody" material, burnt in dedicated boilers for the generation of heat (e.g. on farms) or electricity (possibly co-fired with a fossil fuel), or more advantageously in a combined heat and power (CHP) plant. It might be crop and food-industry wastes (e.g. straw, chaff or the *bagasse* of sugar-cane production), or crops grown specifically for the purpose (e.g. coppiced willow or the grass *Miscanthus*). Forestry trimmings, household waste, etc. add to the list of material that can be burnt. Vegetable oils are also used to produce electricity; for example, in March 2008 it was announced that the Dutch group BioX was installing a power station to be fuelled by palm oil or other vegetable oils and fats at the Noord Natie terminal of Antwerp harbour.[1]

- Biofuels for use in combustion engines for transport. The main products to date are biodiesel, and bioethanol as a substitute for petrol. In Sweden and several other Member States, biogas (see below) is an important biofuel. Biodiesel and bioethanol can be incorporated at low concentrations to be used in existing diesel and petrol engines (making use of the existing supply networks), or used in dedicated engines requiring a dedicated fuel supply system.[2] The industry talks about first- and second-generation technologies. Put simply, first-generation technologies take vegetable oils (or used cooking fats) and turn them into biodiesel and, through fermentation and distillation, produce bioethanol from crops such as maize, sugar and wine-grapes. Second-generation technologies promise, but are not yet really delivering, a range of liquid fuels produced from the whole plant, and not only its edible crop, for example biomass liquefaction via pyrolysis.[3]

- Biogas, produced from anaerobic digestion of animal wastes, food wastes and dedicated crops, in either on-farm or industrial-style digesters, can be used for heat and electricity generation and to power vehicles. It has the added advantage that it can capture the

methane (another greenhouse gas) that would otherwise be released from animal slurry, etc.[4] Similarly, the methane released from landfill waste disposal sites can be captured as biogas. Anaerobic digestion of animal slurries is often seen as an environmentally friendly means of waste disposal, particularly in areas of intensive livestock production.

1.2 Wider policy concerns

Despite the apparent benefits of bioenergy and biofuels, there is a growing chorus of dissent suggesting that the carbon savings might be less than popularly imagined, that other environmental effects could be adverse, and that bioenergy policies in particular helped to fuel the food commodity price spikes experienced in 2008. We do not attempt an assessment of the arguments for and against bioenergy in this report, but it is important to note that the issue is highly political and that policies are subject to change. Thus, in May 2008, in the midst of the 2008 world food "crisis", the UK's Chancellor of the Exchequer, in an open letter to his colleagues on ECOFIN, the EU's Economic and Financial Affairs grouping of the Council of Ministers, suggested *inter alia* that the EU needed to undertake a "close examination of the direct and indirect effects of EU biofuels policy, including a full assessment of its effect on food prices, now and in future" (Darling, 2008). Both within the Member States and within the EU's institutions, particularly the European Parliament, bioenergy, and particularly biofuel, policy is being questioned.

It is rather tempting, for example, to imagine that the carbon footprint of bioenergy production from crops is neutral: carbon is captured in the plant and then released on use. However, the reality can be more complex. If the farmer uses fossil fuels to plant and harvest the crop, and if fossil fuels are used to process and distribute the biofuel, then the carbon savings can be slight; indeed, in some instances, there might be no net savings at all. Where and how the crop is grown can also be important, although identifying an appropriate counterfactual for a benchmark is not easy. But carbon can all too easily be released from carbon sinks, be they forests, wetlands, etc., and increased amounts of nitrous oxide, another greenhouse gas, can be released into the atmosphere. Consequently, there is an increased interest in trying to establish certification schemes to vouch for the claims of greenhouse gas savings associated with particular bioenergy fuels.

It is believed that if bioenergy crops are encouraged, then less land will be available for growing food, and world food prices will increase; indeed, quite large areas of land would have to be devoted to bioenergy crops in order to make a sizeable contribution to the reduction of greenhouse gas emissions. The issue is particularly emotive when food crops are used as feedstocks. Consequently, some politicians and non-governmental organizations (NGOs) have labelled the push for biofuels immoral: for instance, in January 2007 the issue was raised by the Swedish farm minister (*Agra Europe*, 2007a: N/4), and in May 2006 the then Danish minister for transport and energy expressed his ethical opposition to first-generation technologies producing biofuel from food crops (*Agra Europe*, 2006a: N/1). But the pricing effects can be complex. If more oilseeds are grown to extract oil for biodiesel, for example, then more protein-rich oilseed meal will be produced, which could be advantageous for intensive-livestock producers.

Oxfam International (2007), referring specifically to the EU's biofuel target (outlined in Chapter 2), has suggested that not only might this have an adverse effect on food prices, impacting particularly on the world's poor, but also that in the rush to develop plantation-scale production of biofuels in the developing world, the rights of smallholders and indigenous peoples might be jeopardized, leading Oxfam International to suggest that: "In addition to environmental standards, the EU must develop social standards which apply to all biofuels irrespective of their origin" (ibid.: 6).

If more land is brought into production as a result of the push to produce more bioenergy crops, then not only might this release carbon into the atmosphere from tropical rainforests, etc., but also the habitat loss might be severe. Thus, some environmentalists have linked the fate of the orang-utan and its rainforest homes in South-East Asia to the expansion of palm-oil plantations for biodiesel (Murdoch, 2007).

1.3 Structure of the remainder of the report

This document continues with, first, an overview of EU policy on renewable energy and biofuels, including its planned sustainability criteria for biofuels. The following chapter outlines the UK's policies to implement the mandatory targets, although it must be conceded that the UK is not necessarily a typical Member State.

The next chapter outlines those aspects of the CAP that encourage biomass production for bioenergy and biofuel use within the EU. The report then details the EU's trade policy on biofuels, including its preferential trade arrangements, and the potential for EU anti-dumping measures against biodiesel from the USA. To the extent possible, it identifies the EU's imports of biofuels; but hard data on trade volumes are difficult to establish.

The penultimate chapter discusses three further issues that relate to the WTO: first, support for biofuel and its compatibility with WTO provisions; second (but briefly), technical standards and international standardisation; and third, environmental sustainability criteria.

2. THE EU POLICY FRAMEWORK

There is a complex array of policies in place to encourage the production and use of bioenergy in Europe. At the EU level, various CAP measures have encouraged production of suitable crops, which we outline in Chapter 4. Import tariffs are in place (see Chapter 5). Stemming from its international commitments on carbon emission reductions, the EU has agreed that it will adopt binding reduction commitments. An embryonic carbon-emissions trading scheme is in place. Member States are trying to achieve their reduction commitments through a variety of schemes. In the UK this includes the Bioenergy Capital Grants Scheme, supporting biomass projects for heat and CHP, renewable fuel obligations, and tax concessions on biofuels for transport.[5] In this chapter we set out the EU's policy framework for renewable energy, and in Chapter 3 we show how these obligations are being implemented in the UK.

2.1 The renewable energy roadmap

EU policy on renewable energy and biofuels has been evolving for some time. Some Member States had been pursing renewable energy strategies in advance of EU initiatives. In 1997, for example, a Commission White Paper, *Energy for the Future – Renewable Sources of Energy*, suggested a doubling of the renewable energy contribution, to 12 percent of "gross inland consumption by 2010" (Commission of the European Communities, 1997; cited in Commission of the European Communities, 2007a: 4).

EU transport is responsible for about 21 percent of the EU's greenhouse gas emissions, and rising (Commission of the European Communities, 2006a: 3). In 2003, in its Biofuels Directive, the EU established an indicative target for member states: that by the end of 2010, biofuels should account for 5.75 percent "of all petrol and diesel for transport purposes", calculated on the basis of energy content.[6] As an indicative target, this initiative had little impact on the policy response of some Member States, and it was clear that the target was unlikely to be met unless new initiatives were taken. In 2005, for example, the EU-wide share was 1 percent, with Germany accounting for two-thirds of this (Commission of the European Communities, 2007a: 7). The indicative targets set in 2001 for renewable electricity generation[7] were much closer to being met, but some Member States were lagging behind and the Commission had "initiated infringement proceedings against six Member States for not fulfilling their obligations" (ibid.).

Accordingly, in its 2007 communication *Renewable Energy Road Map. Renewable Energies in the 21st Century: Building A More Sustainable Future*, the Commission suggested, *inter alia*, "a mandatory (legally binding) target of 20 percent for renewable energy's share of energy consumption in the EU by 2020" (Commission of the European Communities, 2007a: 3) and that "The minimum target for biofuels for 2020 should, on the basis of conservative assumptions, related to the availability of sustainably produced feedstocks, car engine and biofuel-production technologies, be fixed at 10 percent of overall consumption of petrol and diesel in transport" (ibid.: 10).

On this basis, the European Council (i.e. the meeting of EU heads of state or government) in March 2007 endorsed an integrated climate and energy policy that included:

- a commitment to cut greenhouse gas emissions by 20 percent (compared with a 1990 base) by 2020, and by 30 percent if other countries followed suit; although how this would be shared among the Member States was still to be determined;
- a mandatory target that 20 percent of EU energy supplies should come from renewable sources by 2020 (excluding nuclear power). Again, how this 20 percent percent would be shared among the Member States was to be determined;

- a mandatory minimum 10 percent blend of biofuels to be used by all Member States in "transport petrol and diesel" by 2020;

- to review the EU's Emissions Trading Scheme and "and to consider ... a possible extension of its scope to land use, land-use change and forestry and surface transport" (Council of the European Union, 2007).

It is important to emphasize that the first three points would be binding commitments on the Member States, although the penalty they would face if they failed to deliver on the commitment was unclear. The EU would set the overall framework and adopt some facilitating measures (e.g. changes to the Fuel Quality Directive), but within this framework it would be up to the Member States to decide how to meet the targets. It is impractical in this report to discuss all the measures being pursued by 27 Member States; accordingly, in Chapter 3 we focus on implementation in the UK.

The March 2007 agreement of the European Council was translated into a draft Directive that the Commission presented to the Council and European Parliament in January 2008 (Commission of the European Communities, 2008a). As well as specifying the proposed mandatory targets for renewables by Member State for 2020, and other details, the proposal also referred to a 10 percent renewables share of energy in transport by 2020 (rather than a 10 percent biofuels share in transport petrol and diesel, in the March 2007 agreement of the European Council), and it contained proposed "Environmental Sustainability" criteria for biofuels and bioliquids.[8] These Environmental Sustainability criteria would have to be met if the biofuel (or bioliquid) was to count (i) against the Member State's mandatory targets, (ii) for any renewable energy obligation imposed on business and (iii) for any subsidy payment. They are outlined more fully below.

These proposals then had to be deliberated upon by the Council of Ministers and the European Parliament, before a joint decision of these two institutions could be reached, in a process known as co-decision. The rapporteur of the European Parliament's Committee on Industry, Research and Energy produced a draft report in May 2008 (European Parliament, 2008a) that was largely endorsed by the committee in September (European Parliament, 2008b; *Agra Europe*, 2008a: EP/1) for debate at the European Parliament's plenary session in December. The industry committee's text would have inserted more stringent sustainability criteria for biofuels than had been proposed by the Commission; but after intense tripartite discussions between the Parliament, Council and Commission these were largely dropped, and on 17 December 2008 the European Parliament adopted the Climate Change Package (European Parliament, 2008c).

This has six components:

- revisions to the EU's Emissions Trading Scheme;

- an "effort-sharing" decision on Member State targets for an overall 10 percent reduction in greenhouse gas emissions from sectors of the economy not covered by the Emissions Trading Scheme;

- revisions to the Fuel Quality directive;

- a regulation on CO_2 emissions from cars, under which car companies will face financial penalties if the CO_2 emissions from their new cars exceed specified limits;

- a legal framework to provide for carbon capture and storage;

- the first reading of the new Directive on the Promotion of the Use of Energy from Renewable Sources (European Parliament, 2008d).

The Directive on the Promotion of the Use of Energy from Renewable Sources

Following its first reading in the European Parliament, as reported above, the Directive was adopted by the Council in April 2009 and will be implemented in 2010 (Council of the European Union, 2009). It is of course a long and complex directive, with a number of let-outs, but for present purposes we emphasize three important elements.

The Directive sets out, for each Member State, the share that "energy from renewable resources" must achieve in "gross final consumption of energy in 2020". The numbers follow shortly. These "mandatory national targets", we are told, "are consistent with a target of at least a 20 percent share of energy from renewable sources in the Community's gross final energy consumption in 2020" (European Parliament, 2008d: Article 3). Transfers between the Member States are allowed, but there appear to be no sanctions in place to discipline a Member State that fails to achieve its mandatory target.

The requirement that each Member State ensures that the share of energy from renewable sources in all forms of transport in 2020 is at least 10 percent of final consumption of energy in transport in that Member State is maintained, despite attempts by the industry committee of the European Parliament to tighten the rules. The expectation is that first-generation biofuels will be used, in the main, to meet this obligation. The industry committee had wanted 40 percent of this 10 percent to be supplied by second-generation biofuels or electricity from renewables (European Parliament, 2008c: 11). The compromise agreed will give a double weighting of 2 to second-generation biofuels, in meeting the 10 percent target, and renewable electricity used in road transport (but not rail) will have a weighting of 2.5.

Third, Article 17 of the Directive sets out various "sustainability" criteria.

Sustainability criteria

The European Parliament's Committee on Industry, Research and Energy took the lead in progressing the Commission's proposed directive on renewable energy through Parliament, with Claude Turmes, a member of the Green Party, as its rapporteur. This committee took a particularly strong stance on sustainability criteria. As a result, the directive that emerged from the first reading of the European Parliament in plenary session in December 2008 (European Parliament, 2008d) lays down stricter criteria than the Commission had originally proposed in January 2008 (Commission of the European Communities, 2008a), but, following the consultation procedure with the Council, it was toned down considerably from the text adopted by the committee in September (European Parliament, 2008b). Table 1 summarizes the key differences between these three documents.

The proposed text of the committee would have applied to all biomass for energy purposes, with more stringent criteria for biofuels for transport, whereas the Commission's proposal, and the first-reading text, apply in the first instance to biofuels and bioliquids, with the possibility of an extension, fairly quickly, to other biomass.

Under the Commission's proposal, biofuels had to show a greenhouse gas emissions saving of at least 35 percent (for plants already in operation in January 2008, this would apply from 2013). The industry committee wanted this to be 45 percent, rising to 60 percent from January 2015. The agreed text reverts to the Commission's 35 percent proposal at the outset but then jumps to 50 percent from 2017, with new plants having to show a 60 percent saving from that date. This could lead to segmentation in the supply chain, between implementation and 2013, and after 2017, with older facilities accepting feedstock with lower greenhouse gas emission savings. The Commission's proposal (and the text as adopted), in applying to both biofuels and bioliquids, would have prevented diversion of product from transport to other uses, but paradoxically the industry committee's proposed text would not.

The agreed text has two additional requirements, broadly reflecting the Commission's proposal that (i) the land on which the crops are grown must not have had a high biodiversity value in January 2008 (e.g. designated areas for nature protection, virgin forest, species-rich grassland); and (ii) the land on which the crops are grown must not have had a high carbon stock in January 2008 (e.g. wetlands, continuously forested areas). All these criteria apply to imported as well as EU-produced biofuels, with the potential for WTO concerns, which we discuss in Chapter 6. In the WTO there has been a reluctance to allow discrimination between products based upon production methods.

Table 1: Summary of sustainability criteria, proposed and adopted

Commission Proposal, January 2008: Article 15	Report of the Industry Committee, September 2008, Article 15	After the European Parliament's first reading, December 2008: Article 17
Title: Environmental sustainability criteria for biofuels and other bioliquids	Title: Sustainability criteria for biomass for energy	Title: Sustainability criteria for biofuels and other bioliquids
Greenhouse gas emission savings of at least 35 percent (deferred until April 2013 for installations in operation in January 2008)	Greenhouse gas emission savings on transport fuels of at least 45 percent (deferred until April 2013 for installations in operation in January 2008), jumping to 60 percent from 2016	Greenhouse gas emission savings of at least 35 percent (deferred until April 2013 for installations in operation in January 2008), jumping to 50 percent from 2017; 60 percent for new installations operative from 2017
Not from land with "recognized high bioversity value" in or after January 2008	Biomass for energy not from land with recognized high diversity value in or after May 2003	Not from land with "recognized high bioversity value" in or after January 2008
Not from land "with high carbon stock" in January 2008	Biomass for energy not from land with high carbon stock in May 2003	Not from land "with high carbon stock" in January 2008
	Only if "effective measures have been taken" to address a whole series of environmental issues and various social concerns are met, e.g. including "all workers must have legal contracts, must be remunerated fairly and must have, inter alia, the right to organise and bargain collectively and freedom from discrimination"	"The Commission shall report every two years ... on the impact on social sustainability in the Community and in third countries of increased demand for biofuel, and on the impact of EU biofuel policy on the availability of foodstuffs at affordable prices, in particular for people living in developing countries, and wider development issues. Reports shall address the respect of land use rights"
Commission to report by December 2010 on a sustainability scheme for energy uses of other biomass, including if appropriate proposals to extend to other biomass	The use of land for the production of biofuels shall not be allowed to compete with the use of land for the production of foods	Commission to report by December 2009 on a sustainability scheme for energy uses of other biomass, including if appropriate proposals to extend to other biomass

The European Parliament's Committee on Industry, Research and Energy had wanted to go much further. They would have added a new "food policy" constraint – that "The use of land for the production of biofuels shall not be allowed to compete with the use of land for the production of foods" – and new conditions relating to labour rights (European Parliament, 2008b: amendments 83, 148-153). Whether these proposed conditions were workable (e.g. the proposed food policy constraint) or defendable in the WTO was hotly debated in Europe, and they were dropped from the final text. However, the Commission is now committed to producing a biennial report on social sustainability, the impact on "the availability of foodstuffs at affordable prices" and "land use rights".

Private standards

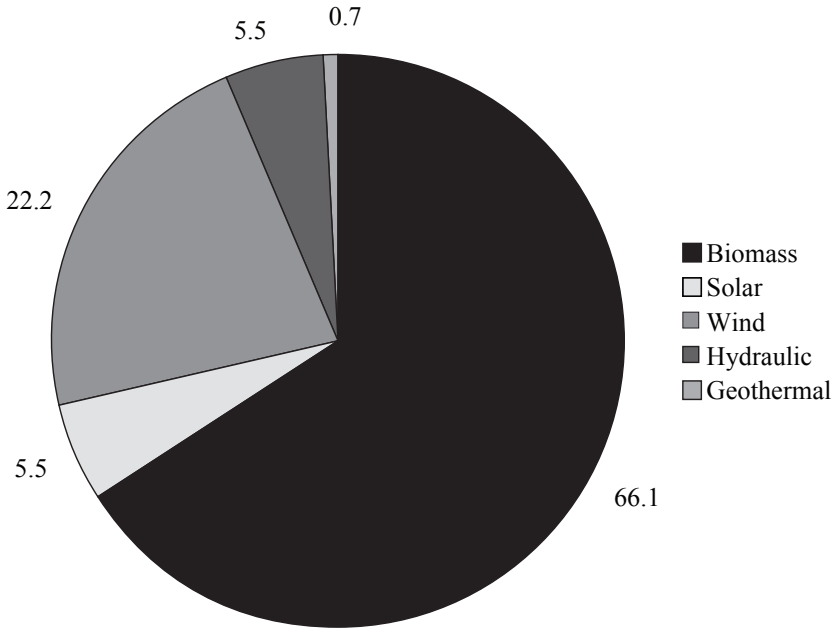
The European Committee for Standardization (Comité Européen de Normalisation; CEN), which develops European Standards to apply in its 30 Member countries, has established a technical committee (CEN/TC 383) with six working parties to develop standards for "sustainably produced biomass for energy applications".[9] For example, Working Group 4 is addressing social and economic aspects. CEN/TC 383's work is mirrored in the UK in the British Standards Institution (BSI) PTI/20.[10] From a Group 4 meeting in the UK that the author has attended, it is unclear how the proposed CEN standard interacts with either EU law on sustainability or UK legislative initiatives (see Chapter 3): whether the CEN standard would simply reflect EU legislation, for example, acting as a private audit of the EU requirements, or whether it would be set at a much higher level, appealing to energy suppliers wishing to demonstrate their social and environmental accountability.

There are other international initiatives. One is the Roundtable on Sustainable Biofuels, an "international initiative bringing together farmers, companies, non-governmental organizations, experts, governments, and inter-governmental agencies concerned with ensuring the sustainability of biofuels production and processing", whose secretariat and website are hosted by the École Polytechnique Fédérale de Lausanne.[11] This grouping has published Version Zero of its *Principles and Criteria for Sustainable Biofuels*, which includes, for example, "Biofuels shall not violate human rights or labor rights, and shall ensure decent work and the well-being of workers" and "Biofuel production shall not impair food security".

2.2 Renewables use in the EU

In contrast to the 20 percent target for renewables in 2020, the EU27 achieved 8.5 percent in 2005 (Eurostat, 2008: 38), with a wide variation between Member States (Table 2). Given that some Member States already make considerable use of renewables, one can readily understand why they might have resisted adopting more. Annex 1 of the new renewable energy directive, reproduced in Table 2.2, sets out the "mandatory national targets" that Member States are expected to achieve by 2020. In 2005, biomass accounted for 66 percent of renewable primary energy production (Figure 1).

Figure 1: Percentage contribution to primary energy production, EU, 2005



Source: http://ec.europa.eu/energy/res/index_en.htm. Accessed 14 November 2007.

Table 2: Percentage share of renewables in EU-27 gross energy consumption, 2005, and targets for 2020

	Share of energy from renewable sources in gross final consumption of energy, 2005	Target for share of energy from renewable sources in gross final consumption of energy, 2020
Belgium	2.2 percent	13 percent
Bulgaria	9.4 percent	16 percent
Czech Republic	6.1 percent	13 percent
Denmark	17.0 percent	30 percent
Germany	5.8 percent	18 percent
Estonia	18.0 percent	25 percent
Ireland	3.1 percent	16 percent
Greece	6.9 percent	18 percent
Spain	8.7 percent	20 percent
France	10.3 percent	23 percent
Italy	5.2 percent	17 percent
Cyprus	2.9 percent	13 percent
Latvia	32.6 percent	40 percent
Lithuania	15.0 percent	23 percent
Luxembourg	0.9 percent	11 percent
Hungary	4.3 percent	13 percent
Malta	0.0 percent	10 percent
Netherlands	2.4 percent	14 percent
Austria	23.3 percent	34 percent
Poland	7.2 percent	15 percent
Portugal	20.5 percent	31 percent
Romania	17.8 percent	24 percent
Slovenia	16.0 percent	25 percent
Slovak Republic	6.7 percent	14 percent
Finland	28.5 percent	38 percent
Sweden	39.8 percent	49 percent
United Kingdom	1.3 percent	15 percent

Source: European Parliament (2008d: Annex 1)

In 2003 biofuels accounted for a mere 0.6 percent of total transport fuel supplies, and in no Member State was it higher than 1.33 percent (Sweden) (Commission of the European Communities, 2006a: 19). By 2006, according to United States Department of Agriculture (USDA) estimates, the overall percentage had risen to 2.06 percent and was forecast to rise to 3.75 percent in 2010 (Table 3). It is evident that biodiesel has been, and remains, a more important fuel than bioethanol in the EU.

Table 3: Estimated EU-27 biofuel consumption (ktoe*)

	2006	2007 e	2008 e	2009 f	2010 f
Biodiesel	4170	5460	6000	7610	8960
Pure vegetable oil	915	620	415	190	200
Bioethanol	945	1350	1700	2055	2570
Second-generation biomass liquids	0	0	5	10	10
Total biofuels	6030	7430	8120	9865	11 740
Biofuels as a share of total transport fuel used	2.06 percent	2.49 percent	2.68 percent	3.21 percent	3.75 percent

Source: USDA (2008a: 5).

e, estimate; f, forecast.

* Various fuels and biofuel differ in their energy content, thus the data in the table are stated in 1000 tonnes of oil equivalent (ktoe) to provide better comparability.

EU biodiesel production is based largely on rapeseed oil, although soybean oil (presumably derived from imported soybeans) and imported palm oil are also important ingredients (Table 4). Imports of biodiesel accounted for less than 3 percent of EU biodiesel consumption in 2006, but the USDA forecasts a 14 percent market share in the latter part of the decade.

Table 4: EU-27 biodiesel production, imports and consumption (1000 tonnes), and percentage share of diesel market

Source	2006	2007 e	2008 e	2009 f	2010 f
Rapeseed oil	3150	3550	3700	4900	5650
Soybean oil	800	900	900	1000	1200
Palm oil	150	400	400	420	450
Sunflower	180	220	300	420	450
Other and not attributed	110	110	100	100	160
Subtotal vegetable oils	**4390**	**5180**	**5400**	**6840**	**7910**
Recycled vegetable oil	120	135	230	300	490
Animal fats	10	35	130	160	200
Grand total	**4520**	**5350**	**5760**	**7300**	**8600**

Table 4: EU–27 biodiesel production, imports and consumption (1000 tonnes), and percentage share of diesel market cont.

Source	2006	2007 e	2008 e	2009 f	2010 f
Imports	136	750	1000	1200	1400
Consumption	4658	6100	6700	8500	10 000
Biodiesel share of diesel market	2.3 percent	3.0 percent	3.2 percent	4.0 percent	4.6 percent

Source: USDA (2008a: 9, 11, 13).

e, estimate; f, forecast.

In contrast, bioethanol imports account for a much larger share of the EU's bioethanol market than is the case for biodiesel and diesel: almost 40 percent in 2009 according to USDA estimates (Table 5).

Table 5: EU–27 bioethanol production, trade and consumption (million litres), and percentage share of petrol market

	2006	2007 e	2008 e	2009 f	2010 f
Production	1584	1711	2155	2535	3346
Imports	317	995	1267	1584	1774
Exports	38	44	63	63	51
Consumption	1863	2662	3359	4056	5070
Bioethanol share of petrol market	0.8 percent	1.2 percent	1.5 percent	1.8 percent	2.2 percent

Source: USDA (2008a: 13, 17).

e, estimate; f, forecast.

Availability of source materials, and past policies pursued in the Member States, strongly influenced the development of the biofuels industry. Table 6, from a different source than earlier tables in this section, gives an overview of the situation in 2007, before EU targets had begun to bite. Germany is seen to be the dominant producer and consumer of biodiesel, and many Member States (notably the UK) have a low level of self-sufficiency.

Table 6: Biodiesel and bioethanol production and consumption, by Member State, 2007

	Biodiesel			Bioethanol		
	C TOE	P TOE	SS	C TOE	P TOE	SS
Germany	2 957 463	2 485 400	0.84	293 078	200 940	0.69
France	1 161 277	749 920	0.65	272 937	294 780	1.08
Austria	367 140	229 620	0.63	21 883		
Spain	260 580	144 480	0.55	112 640	177 480	1.58
UK	270 660	129 000	0.48	78 030	10 200	0.13
Sweden	99 602	54 180	0.54	181 649	35 700	0.20
Portugal	158 853	150 500	0.95	0		
Italy	139 350	312 180	2.24	0	30 600	
Bulgaria	46 336	7740	0.17	66 160		

Table 6: Biodiesel and bioethanol production and consumption, by Member State, 2007 cont.

	Biodiesel			Bioethanol		
	C TOE	P TOE	SS	C TOE	P TOE	SS
Poland	15 480	68 800	4.44	85 200	79 050	0.93
Belgium	91 260	142 760	1.56	0		
Greece	80 840	86 000	1.06	0		
Lithuania	41 000	22 360	0.55	11 600	10 200	0.88
Luxembourg	34 098	0	0.00	865		
Czech Republic	32 660	52 460	1.61	180	16 830	93.50
Slovenia	12 993	9 460	0.73	794		
Slovakia		39 560		13 262	15 300	1.15
Hungary	0	6 020		9180	15 300	1.67
Netherlands		73 100		8670	7140	0.82
Ireland	4612	2 580	0.56	2352		
Denmark	0	73 100		6025		
Latvia	2	7 740	3870	1738	9180	5.28
Malta	0	860				
Finland		33 540				
Cyprus		860				
Estonia		0				
Romania		30 960				
Total	5774k	4913k	0.85	1166k	902k	0.77

Source: EurObserv'ER (2008: Tables T2, T3 and T5).

C, consumption; P, production; SS, self-sufficiency (production/consumption).

Blanks indicate missing production data, and "not available" consumption data, in the original source.

Consumption data were reported in tonnes of oil equivalent (TOE), but production data were converted from tonnes of biodiesel (at 1 tonne of biodiesel = 0.86 TOE) and litres of bioethanol (at 1 m^3 of bioethanol = 0.51 TOE).

2.3 The EU's greenhouse gas emission trading scheme

This scheme began in January 2005 and is characterized as a "cap and trade" scheme. Initially the only greenhouse gas covered was carbon dioxide, but there are ambitions to widen the scheme's scope. Similarly, the scheme does not cover all emitters of carbon dioxide: it covers heat and power generation, and heavy industry such as iron and steel, and cement works. A size threshold applies, excluding smaller units. Member States allocate emission permits to the companies subject to the scheme, determining the maximum amount of carbon dioxide they can emit. If they want to emit more, they must acquire additional permits. If, by reductions in energy consumption or increased use of nuclear or renewable energy, they emit fewer carbon dioxide emissions emanating from fossil fuels, then they will have permits to sell. Thus, a market in permits can arise. In 2008 the Commission claimed: "At present some 11 000 installations in the EU are included, accounting for around 50 percent of the EU's total CO_2 emissions and about 40 percent of its overall greenhouse gas emissions" (European Commission, 2008c: 13). Phase I ran from 2005 to end 2007, and Phase II from 2008 through 2012. The Climate Change Package adopted by the European Parliament (ibid.: 3–5) in December 2008 forms part of the

review for the post-2013 regime. The plan is to expand the coverage to new industries (e.g. petrochemicals), add two more greenhouse gasses (nitrous oxide and perfluorocarbons), and begin allocating allowances by auction rather than the current practice of free distribution to the industrial operators concerned.

Although much could be, and has been, written about the allocation procedures and the effectiveness of the EU's Emission Trading Scheme, a more robust "price" emerged for Phase II carbon dioxide emission permits than had been the case under Phase I – until, that is, prices collapsed with the onset of the global recession.[12] For those companies subject to the Emissions Trading Scheme, there is a further financial incentive to use biomass to generate electricity, or to provide heat and power, because by burning biomass rather than fossil fuels the emission of fossil carbon dioxide is reduced, so releasing emission certificates for sale on the open market.

2.4 Other EU legislation

Relevant provisions of the CAP are outlined in Chapter 4, and its import regime for biofuels in Chapter 5. Here, brief mention is made of the Fuel Quality Directive and the Energy Taxation Directive.

Fuel Quality Directive[13]

The Fuel Quality Directive forms part of the EU's single market legislation: by setting out minimum technical standards with which products must comply, technical barriers to trade within the EU can be eliminated; although of course, if different standards apply from one international jurisdiction to another, international trade barriers can be created. We return to this in Chapter 6.

In January 2007, the Commission tabled proposals to amend the Directive (Commission of the European Communities, 2007b), and these too formed part of the European Parliament's Climate Change Package agreed in December 2008. For the purpose of this report, two elements are particularly relevant. First, the changes should facilitate the inclusion of bioethanol in petrol. Second, suppliers "should reduce ... greenhouse gas emissions caused by extraction or cultivation, including land-use changes, transport and distribution, processing and combustion of fuels, by up to 20 percent by 2020" (European Parliament, 2008c: 14). Two ways in which they could do this are by improving the efficiency of their refinery operations and by including more biofuel in their supplies.

Energy Taxation Directive[14]

The purpose of this Directive is to set

> minimum rates of taxation applicable to energy products when used as motor or heating fuels and to electricity. Its aim is thus to improve the operation of the internal market by reducing distortions of competition between mineral oils and other energy products. In line with the Community's objectives and the Kyoto Protocol, it encourages more efficient use of energy so as to reduce dependence on imported energy products and limit greenhouse gas emissions.[15]

Specifically, Member States are allowed to apply total or partial exemption from taxes for biofuels and for "forms of energy which are of solar, wind, tidal or geothermal origin, or from biomass or waste". Kutas, Lindberg and Steenblik (2007) provide a detailed inventory of the implementation of the directive as of July 2007.

3. UK IMPLEMENTATION

As explained in Chapter 2, although the EU is in the process of setting mandatory targets for the use of renewables in primary energy use, and for road transport and other framework legislation, it is the responsibility of the Member States to devise the incentive packages to deliver these targets. Rather than attempt to cover all 27 Member States, this chapter focuses on the UK, although it should be recalled that the UK is not necessarily representative of the whole. As with other Member States, the UK already had policies in place, reflecting its own national policy priorities and the advisory targets established by the EU in the past.

The 2020 RO for the UK has been set at 15 percent compared with the 1.3 percent actually achieved in 2005 (see Table 2). The Renewables Advisory Board has said of this target that if it "is to be approached we need to establish a different energy world with new policy, economic and social drivers" (Renewables Advisory Board, 2008: 4) and that, on the basis of current policies (their "business a usual" scenario), their "best estimate is that the UK will achieve about 6 percent of ... energy from renewables" (ibid.: 3). Thus, new policy initiatives would be needed.

In addition to capital funding under the CAP's Rural Development Regulation (see Chapter 4), most Member States have other incentive programmes to encourage investment in bioenergy facilities. One such scheme is the Bio-energy Capital Grants Scheme in England, now administered by the Department of Energy and Climate Change. The grant is at "a variable rate of up to 40 percent of the difference in cost of installing the biomass boiler or CHP plant compared to installing the fossil fuel alternative", to a maximum of £500 000 in the current fifth round.[16]

3.1 UK: renewables obligation

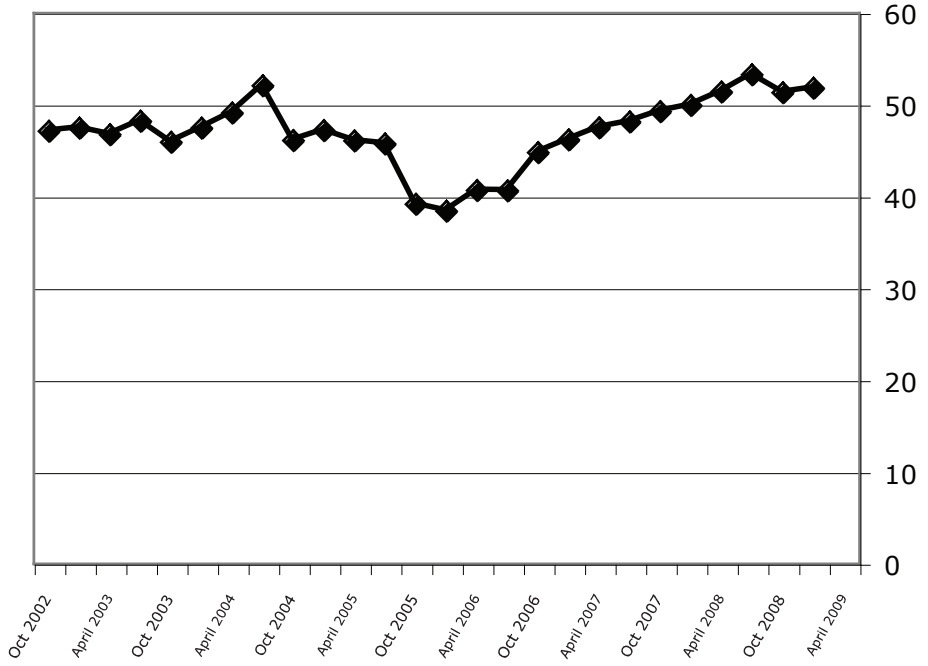
Since 2002, licensed electricity suppliers in the UK have had to source some of their supplies from renewables or face a financial penalty. The obligation had risen to 9.1 percent for the obligation period 2008–09, beginning on 1 April 2008, and was set to rise to 15.4 percent in 2015 and then hold steady to 2027, when the obligation would cease. The Renewables Advisory Board, in its 2020 Vision, warned that if the EU's 15 percent renewables target was to be met, then "approximately 40 percent of the grid-connected electricity market" would have to be fed from renewables (Renewables Advisory Board, 2008: 4) and that "investors need confidence that the renewables market will support investments made between now and 2020 well beyond the current RO mechanism that terminates in 2027" (ibid.: 5). Under the Energy Act 2008, which completed its passage through Parliament in November 2008, the predetermined percentage is replaced by an annual obligation set "at a certain level above the forecast level of renewables deployment from year to year ('guaranteed headroom')." A consultation in June 2008 sought views on further possible changes to the existing mechanisms, for example whether the obligation should be extended to 2035, given that new investments after 2015 were unlikely with a 2027 end date (Department for Business Enterprise and Regulatory Reform, 2008b: 96). In the 2008 Pre-Budget Report, the government announced the extension of the RO to "at least 2037", while stressing that "the extension ... does not mean that we intend to provide an additional ten years of support to all existing projects" (Department of Energy and Climate Change, 2008: 15–16).[17] For existing projects, the support mechanisms of the RO will continue until 2027, and all projects are guaranteed at least 17 years of support.

When electricity is produced from renewable sources, the generator receives renewable obligation certificates (ROCs). Until April 2009 it was one ROC for each megawatt hour (MWh) generated. Electricity suppliers have to acquire sufficient ROCs to match the obligation, by generating renewable electricity themselves or buying ROCs from independent generators, or else

they must "buy out" their obligation. At the start of the scheme in 2002, the buy-out price was set at £30 per MWh (3 pence per kWh), and it increases annually in line with inflation (Department of Trade and Industry, 2007: 147). The revenues are paid into a fund administered by the Office of Gas and Electricity Markets (Ofgem),[18] which is then shared out between the electricity suppliers that have redeemed ROCs. ROCs are traded. The Non-Fossil Purchasing Agency (http://www.nfpa.co.uk) arranges online auctions for its clients, usually four times a year, for a fee of 50 pence per ROC (subject to a minimum fee of £50). The average price received for ROCs at the January 2009 auction was £51.81 (Figure 2).

At first glance it is not obvious why electricity suppliers would buy ROCs at auction at a price in excess of the buy-out price. However, as noted above, when they redeem ROCs they become entitled to a share of the funds that Ofgem has collected from suppliers that have bought out their obligation. Thus, the auction price for ROCs is a gross price: the net price that electricity providers expect to pay must also take into account their expected receipts from Ofgem when they redeem their ROCs, and it will be profitable for them to bid for ROCs only if the expected net price is less than the buy-out price.

Figure 2: Quarterly auction prices for renewable obligation certificates (ROCs) (£) (January, April, July, October)



Source: http://www.e-roc.co.uk/trackrecord.htm. Accessed 19 January 2009.

The value of the ROC is an important part of the revenue stream for independent generators of "green" electricity that they sell on to retail suppliers. For example, the Bioenergy RE-Generation Project (2007: 5) reported electricity prices of about £30 per MWh in July 2007. Clearly the electricity consumer is paying a higher price for electricity as a result of the RO.

The sale value of the ROC is highly dependent on the market balance. If, overall, the supply of renewable energy falls short of the obligation, Ofgem receives revenues that are then recirculated to those businesses that have redeemed ROCs, and then the market value of the ROC exceeds the buy-out price. If there were no overall shortage and no need for any supplier to pay the buy-out price, then the market value of ROCs would be less than the buy-out price and would fall away to zero if all licensed electricity suppliers were able to meet their own needs. This "cliff-edge" scenario is one that has troubled private investors in green technology. Following adoption of the

Energy Act 2008, the government intends to set the obligation on an annual basis, to "keep RO levels" above the level of renewables generation "up to our existing aspiration for some 20 percent of electricity to come from renewables" (Department of Energy and Climate Change, 2008: 27). Thus, for 2009–10, with the new "banding" system in place (see below), the obligation will be 9.7 ROCs per 100 MWh supplied (ibid.: 27).

The new "banding" regime addresses concerns that, by treating all renewables equally in the grant of ROCs, there was too much support given to some technologies, and too little to others. Thus, the Energy White Paper had flagged the idea that, from April 2009, more ROCs should be given for the newer, emerging technologies. As a result, the Energy Act 2008 gave the government powers to implement a new Renewables Obligation Order, to put into practice this new banding system, as outlined in Table 7, which it did as of 1 April 2009. This will make some bioenergy projects more financially attractive (e.g. anaerobic digestion) and others less so (e.g. landfill gas), but some existing investments will be protected as a result of "grandfathering" provisions. It also gives a higher ROC allocation to technologies that combine heat and power generation (CHP); the government has also announced plans to explore the possibility of introducing a separate Renewable Heat Incentive. If such a scheme were to be introduced, these bandings would change (Department of Energy and Climate Change, 2008: 6). The government believes that, between 2009 and 2013, when the results of the next banding review will be implemented, one ROC will on average be issued for each MWh of renewable energy generated (ibid.: 10).

Table 7: The UK's renewable obligation certificate (ROC) banding regime, from April 2009

Generation type	ROCs/MWh
Hydroelectric	1
onshore wind	1
Offshore wind	1.5
Wave	2
Tidal stream	2
Tidal impoundment – tidal barrage	2
Tidal impoundment – tidal lagoon	2
Solar photovoltaic	2
Geothermal	2
Geopressure	1
Landfill gas	0.25
Sewage gas	0.5
Energy from waste with CHP	1
Pre-banded gasification	1
Pre-banded pyrolysis	1
Standard gasification	1
Standard pyrolysis	1
Advanced gasification	2
Advanced pyrolysis	2
Anaerobic digestion	2
Co-firing of biomass	0.5
Co-firing of energy crops	1

Table 7: The UK's renewable obligation certificate (ROC) banding regime, from April 2009 cont.

Generation type	ROCs/MWh
Co–firing of biomass with CHP	1
Co–firing of energy crop with CHP	1.5
Dedicated biomass	1.5
Dedicated energy crops	2
Dedicated biomass with CHP	2
Dedicated energy crops with CHP	2

Source: Department of Energy and Climate Change (2008: 7–8). An extended version of the table, "including the definitions for each type", was made available at http://www.tinyurl.com/64cuq9.

CHP, combined heat and power.

The Energy Bill also contains provisions for the government to introduce feed-in tariffs for operators with up to 5 MW capacity, and it intends to consult on the details of this in summer 2009 (Department of Energy and Climate Change, 2008: 15). Feed-in tariffs, as used for example in Germany, are widely canvassed as a superior alternative to a renewables obligation (e.g. see Mitchell, Bauknecht and Connor, 2006). Although many variants are possible (and, as noted, the British government is about to consult on this), the basic idea is that some external authority determines the tariff that the electricity supplier must pay the generator for renewable electricity, with higher rates for newly emerging technologies, thus guaranteeing both the sale price and the outlet. Although electricity suppliers have a financial incentive to acquire ROCs from renewable electricity generators, they are not obliged to buy the electricity as well; and negotiating access to the system is not necessarily a trivial issue, especially for small-scale generators.

3.2 UK: taxation of transport fuels

As noted in Chapter 2, in 2003 the Biofuels Directive set non-mandatory "reference values" of a 2 percent market share for biofuels in 2005 and a 5.75 percent share in 2010. To help achieve this policy goal, the Energy Taxation Directive allowed Member States to apply an abated rate of tax for biofuels used for transport. In the UK this results in an abatement of 20 pence per litre on bioethanol and biodiesel for road transport, which the government has promised will be maintained until at least 2010 (Department of Trade and Industry, 2007: 242), compared with the full tax rate of 52.35 pence per litre applied from 1 December 2008 to 31 March 2009.

The basic legal requirement in the UK is that road fuel duty must be paid on all fuel substitutes before these are used to power a vehicle. Consequently, a business cannot simply make biodiesel from used cooking fats without first making arrangements to pay the appropriate duty to HM Revenue and Customs, and the abated rate (i.e. 20 pence per litre less than the full rate) will apply only if the producer can demonstrate to HM Revenue and Customs that "their product meets all aspects of the legal definition [of biodiesel in this quotation] and sufficient tests must be carried out to prove the specification is met".[19]

It is instructive to contrast the different experiences of Germany and the UK with respect to the taxation of road fuel. In Germany, the traditional approach had been to tax only mineral oils, and so biodiesel, as B100, was exempt from duty. Thus, from the early 1990s, B100 was a cheap alternative to conventional diesel, particularly for transport fleets with dedicated supply lines. In 2004, this duty concession was extended to the biofuels included in blends

such as B5, considerably expanding the market (Bomb et al., 2007: 2259). However, from January 2007 Germany introduced mandatory blending requirements (of 4.4 percent energy content for biodiesel and 2 percent for ethanol), and began reducing the tax relief on this mandatory proportion in a phased fashion until 2012. Thus, the biofuel duty was fixed at €0.09 per litre for 2007, and it will increase to the full €0.45 applied to mineral oils in 2012 (Agra Europe, 2006b: N/3). By contrast, in the UK it was road transport fuel that was taxed, and it was not until 2002 that duty reductions applied on biodiesel (and extended to bioethanol in 2005) (Bomb et al., 2007: 2261), and even then at a far less generous rate than in Germany. It is not only Germany that is reducing tax breaks on biofuels: France too has been reducing its tax rebates and, in its 2009 Budget Bill, indicated its intention of eliminating them in 2012 (USDA, 2008b).

3.3 The UK's Renewable Transport Fuel Obligation

The UK introduced an RTFO in April 2008, similar to the RO for electricity suppliers. The government's intention is that the RTFO will last until "at least 2020". An "obligated company" is one that supplies more than 450 000 litres per year of hydrocarbon oil road transport fuel (Renewable Fuels Agency, 2009: Glossary). The RTFO is 2.5 percent (by volume) of each obligated company's aggregate fuel sales in 2008, and it was planned that it should increase in 3.75 percent in 2009 and 5 percent from 2010 (but see below). Thereafter, it will be increased, provided fuel and vehicle technical standards allow (in particular, that blends of more than 5 percent do not lead to mechanical problems), that biofuels are produced sustainably, and that "the costs to consumers will be acceptable, both in terms of fuel prices at the pump, and in terms of wider economic impacts, including for example the impacts on food prices and other industries which make use of similar feedstocks" (Department of Trade and Industry, 2007: 242). The government is developing Environmental Assurance Schemes, because RTFO suppliers will need to demonstrate the carbon savings they are claiming.

Renewable transport fuel obligation certificates (RTFOCs) are issued on the quantity of renewable fuel on which duty has been paid. These certificates are then used to demonstrate compliance. Certificates are tradable, but suppliers of fossil fuels can buy out their obligation. As with ROCs, these buy-out revenues are then shared out among the suppliers that have redeemed RTFOCs. For the first two years the buy-out price has been set at 15 pence per litre, and the government has guaranteed that "the total package of support (buy-out + duty incentive)" will be 35 pence in 2009–10 and 30 pence in 2010–11.[20] In the 2008 Budget, the Chancellor announced that the fuel tax rebate would cease in 2010 and that the RTFO buy-out price would be set at 30 pence per litre (HM Treasury, 2008: Paragraph 6.34).

The Renewable Fuels Agency is also responsible for implementing the government's plans on sustainability. Suppliers have to "report on the level of carbon savings and sustainability of the biofuels they supply". If they fail to do so, they will not be issued with RTFOCs. From 2010 "the Government aims to reward biofuels under the RTFO according to the amount of carbon they save" and subject to EU and WTO constraints; and from 2011 "the Government aims to reward biofuels under the RTFO only if they meet appropriate sustainability standards".[21]

In the first six months of the scheme (15 April–14 October 2008), the RTFO was surpassed, partly as a result of a drafting error in the regulations, and consequently some RTFOCs will be carried forward to 2009–10. RTFOCs were trading at just below 10 pence per litre in November 2008 (private communication, 16 November 2008). Between April and October 2008, 16 percent of RTFOC supplies were of bioethanol, 84 percent of biodiesel, and a very small quantity of biogas. Interestingly, most was imported or made from imported feedstock (Table 8).

Because of concerns that biofuels can adversely affect the environment and fuel food prices, the government asked the chairman of the Re-

Table 8: Renewable transport fuel obligation (RTFO) fuel sources, 15 April–14 October 2008

Main origins	Bioethanol	Biodiesel
UK	16 percent	6 percent
Germany		15 percent
USA		38 percent
Brazil	82 percent	
Unknown	0 percent	23 percent

Source: Renewable Fuels Agency (2009: RTFO graphs).

newable Fuels Agency, Professor Ed Gallagher, to review the situation (Renewable Fuels Agency, 2008). The Gallagher Review concluded that "The assessments underpinning the EU 2020 10 percent target and RTFO did not adequately address indirect land use change"; and it recommended that, although the existing target for 2008–09 should remain unchanged, the RTFO Order should nonetheless be "amended to require a lower rate of increase of 0.5 percent pa rising to a maximum of 5 percent by volume by 2013" (ibid.: 14). In January 2009, the government announced an RTFO of 3.25 percent in 2009–10 – midway between the Gallagher Review's 3.0 percent and the originally mandated 3.5 percent – and thereafter increasing progressively to 5 percent in 2013–14 (Department for Transport, 2009).

3.4 The rationale for road fuel taxation?

There are a number of reasons why governments might wish to tax fuel for road transport. Three reasons apply, regardless of the characteristics of the fuel: (i) to raise revenue for the general government budget, (ii) to cover the cost of road provision and (iii) to as a proxy for a tax on congestion. A congestion tax would, potentially, be more effective, and efficient, if applied as a charge (or toll) on road use, which could be varied according to levels of congestion; and the revenues could be applied to cover the cost of providing and maintaining the road system.

The fourth reason that could be advanced for taxing road fuel is as an environmental tax on greenhouse gas emissions. Economists would tend to argue that any use of fossil fuels that resulted in carbon dioxide emissions (or release of carbon sinks from the soil, wood, etc.) should attract such a tax and that, by taxing only one use, economic distortions are created; but the political reality, for the moment, is that it is road fuel that is the focus of attention.

So what would be the appropriate carbon tax on fossil fuels (petrol and diesel) used in road transport? One litre of petrol releases 2.32 kg CO_2 when used, and one litre of diesel releases 2.63 kg CO_2.[22] When buying a flight with the airline BA, passengers are advised that they can offset their carbon emissions by purchasing an offset through Morgan Stanley. On 12 November 2008, the quoted price was £17.60 per tonne of CO_2. This is somewhat lower than the British government's shadow price of carbon for policy analysis: for 2009, this is fixed at £26.50 per tonne of CO_2.[23]

But using the government's figure of £26.50 per tonne, the cost of abating the direct carbon dioxide emissions of petrol and diesel would be 6.1 and 6.9 pence per litre, respectively. Recall that the rebate on road fuel tax for both ethanol and biodiesel is 20 pence per litre; thus, the larger part of the road fuel tax rebate (and any financial inducement inherent in the RTFO) must be there for some other reason, such as encouraging investment in the industry.

4. CAP POLICY MEASURES

There are relatively few CAP provisions that directly encourage biomass production for energy purposes. These are discussed in turn below.

4.1 Set-aside

Under the set-aside arrangements introduced into the CAP by the MacSharry reforms of 1992, set-aside land could be used for non-food crops (including crops grown for bioenergy purposes), provided that contractual arrangements ensured that the product did not reappear in the CAP supported market. Crops with no food or animal feed potential could be grown without contract. This allowed extra revenues to be earned from set-aside land, without forfeiting the set-aside payment. Detailed rules were set out by the Department for Environment, Food and Rural Affairs (2005).

Set-aside is, however, is to be abolished. With the introduction of the Single Payment Scheme (SPS) in 2005 (see below), the retention of set-aside looked rather odd, and the surge in world commodity prices in 2007–08 sealed its fate. In September 2007, EU farm ministers agreed to reduce the set-aside rate to 0 percent for the 2008 crop (*Agra Europe*, 2007b: EP/5); and in November 2008, as part of the so-called "Health Check" reform of the CAP, ministers agreed that set-aside be abolished from 2009 (Commission of the European Communities, 2008b: 8; *Agra Europe*, 2008b: EP/6).

Set-aside payments have been declared by the EU in the blue box (see Chapter 6 for further explanation), but the declaration does not differentiate between land used for bioenergy crops and other uses.

In the Uruguay Round, following the accord with the USA at the Blair House meeting in November 1992, the EU committed itself to limit its production of oilseeds on set-aside land, as part of the package agreed to settle the long-standing oilseeds dispute (Swinbank and Tanner, 1996: 131–2). Specifically Paragraph 7 of the Memorandum of Understanding on Oilseeds stated that if the by-products of this production exceeded "one million metric tonnes annually expressed in soybean meal equivalents", then the EU would take "appropriate corrective action".[24] This rather imprecise provision was never triggered. Earlier in the text, Paragraph 2 had specified that the provisions related to "crop specific oilseeds payments"; and the EU argued that crop-specific payments ceased with the Agenda 2000 reforms in 1999, when the arable area aid payments for oilseeds were harmonized with those for cereals.

4.2 Single Payment Scheme

The Fischler reforms of 2003 introduced a further element of decoupling (Swinbank and Daugbjerg, 2006). The SPS replaced the area and headage payments that had applied since 1992, under which crops had to be grown and animals kept if the payment was to be claimed. In most Member States, including the UK, the SPS is fully decoupled from crop production, which should mean that there is no policy inducement to grow one particular type of crop rather than another. There are, however, various cross-compliance rules, applicable to the whole farm, if the SPS payment is to be collected without penalty.

4.3 Energy Crops Scheme

In the framework of the SPS, a new, coupled, scheme was introduced: farmers could claim a payment of €45 per hectare, subject to a maximum area of 2 million hectares across the EU-27, if they grew energy crops. The areas claimed in the first three years fell short of this. In 2007, though, claims were submitted for about 2.84 million hectares, meaning that all the claims had a reduction coefficient of 0.70337 applied (European Commission, 2007). In its discussion document "Preparing for the 'Health Check' of the CAP reform", the Commission had said: "it should be examined whether the present support scheme for energy crops is

still cost effective in the light of new incentives for biomass production (compulsory energy targets and high prices)".[25] It also emphasized the crucial role of research on "second generation biofuels" and suggested that "incentives for developing second generation biofuels should be reinforced within [rural development] measures" (Commission of the European Communities, 2007c, Paragraph 4.2). Accordingly, it did propose the abolition of the energy crops scheme from 2010 (Commission of the European Communities, 2008b: 19, 85), and in November 2008 the Council accepted this (*Agra Europe*, 2008b: EP/6).

The Energy Crops Scheme has been declared as blue box support (WTO, 2009: 23). Total expenditure, however, was capped at €90 million, which is trivial in relation to the €13 445.2 million in blue box expenditure declared for 2005-06 (WTO, 2009: Supporting Table DS:3).

In 2007 about 4 million hectares (mostly rapeseed) was devoted to energy crop production (Table 9), compared with 59.2 million hectares devoted to cereals (excluding rice) and 4.8 million hectares in rape across the EU-27 in 2005 (European Commission, 2008a: Table 3.5.2.2). Table 9 shows the growth in the use of the energy crop premium, a static level of production on set-aside land (although it is unclear from this source whether the data refer to all non-food crops on set-aside land or only to energy crops), and a sharp drop in 2007 in land in neither set-aside nor the energy crops scheme, and presumably reflecting the higher returns farmers expected from food crops.

Table 9: EU arable land with energy crops, by type of support (million ha)

	2003	2004	2005	2006	2007
Total non-food on set-aside land, *of which:*	0.9	0.5	0.9	1.0	1.0
rapeseed		*0.4*	*0.7*	*0.8*	*0.8*
cereals		*0.0*	*0.1*	*0.1*	*0.1*
Land use with energy crop premium, *of which:*		0.3	0.6	1.3	2.8
rapeseed		*0.2*	*0.4*	*0.8*	*2.0*
cereals		*0.0*	*0.1*	*0.2*	*0.3*
Other, *of which:*	0.3	0.8	1.6	1.4	0.2
rapeseed			*1.3*	*0.9*	*0.1*
cereals			*0.3*	*0.4*	*0.2*
Total	1.2	1.6	3.1	3.7	4.0

Source: European Commission: http://ec.europa.eu/agriculture/bioenergy/index_en.htm. Accessed 7 November 2008

2006: EU-25; 2007: EU-27, estimated.

"Other" is calculated from oilseed and cereal market balance sheets.

4.4 Sugar, wine, rye...

In the recent reform of the sugar sector, sugar beet grown for bioethanol production was made exempt from the quota mechanism. Throughout the history of the wine regime, surplus wine has been distilled; although some of the resulting alcohol has been potable, much has been used as bioethanol (Swinbank and Ritson, 1992: 41-5).[26] Other intervention stocks have also been disposed of in this way: for example, "In 2005 ... a tender for rye from intervention stocks was opened specifically for bioethanol production" (Commission of the European Communities, 2006b: 12). In addition there are long-standing national aid schemes for "ethyl alcohol of agricultural origin" that are reported as part of the EU's Aggregate Measurement of Support (WTO, 2009: Supporting Table DS:8).

4.5 Pillar 2

A differentiation is made between Pillar 1 and Pillar 2 of the CAP. Pillar 1 refers to the market price and income supports, including the SPS, and applies uniformly throughout the EU (although transitional arrangements are still in place in the new member states). Pillar 2 refers to measures undertaken under the Rural Development Regulation. This has three axes: Axis 1 provides for grant aid to improve the competitiveness of farm businesses; Axis 2 funds agri-environmental measures; and Axis 3 provides for grant aid to diversify the rural economy and improve the quality of life in rural areas. (There is also an overarching provision to aid local initiatives under the Liaison Entre Actions pour le Developpement de L'Economie Rurale (LEADER) programme.) Member States have to draw up their own rural development plans from a menu of provisions laid down in Regulation 1698/2005, covering the period 2007–13, for approval by the Commission.

Under their rural development programmes, Member States can give grants to facilitate the establishment of bioenergy projects but, because of the discretion allowed, schemes (and funding) can differ significantly from one Member State to another and even within Member States.

In England, under the Energy Crops Scheme, farmers were initially invited to apply for grant aid to establish Miscanthus (at £800 per hectare) and short-rotation coppice (£1000 per hectare).[27] This followed on from a similar scheme in the previous programme in 2000–06. However, the scheme, as approved by the Commission, switched from a fixed area payment to one calculated at 40 percent of "actual establishment costs" determined on a case-by-case basis.[28]

As we saw earlier, in its preliminary reflections on the "Health Check", the Commission suggested that the Rural Development Regulation should be amended to give enhanced support to second-generation biofuels (Commission of the European Communities, 2007c: Paragraph 4.2); and in its formal proposals of May 2008, a number of "indicative types of operations" were listed for inclusion by the Member States in their rural development plans from 2010. Under "renewable energies", the four examples given were: biogas production (both "on farm and local production"); perennial energy crops such as herbaceous grasses; "processing of agricultural/forest biomass for renewable energy"; and installation of infrastructure for renewable energy production (Commission of the European Communities, 2008c: 141, 145–6). This proposal was adopted by the Council in November 2008 (*Agra Europe*, 2008b: EP/7).

5. IMPORT ARRANGEMENTS AND TRADE

The EU imports both raw materials for bioenergy production and biofuels. In this chapter we set out the tariffs that would apply to biofuels, try to give some indication of trade volumes, and outline the issues related to the alleged "dumping" of biodiesel from the USA.

Although we have no data on imports of biomass for electricity generation, anecdotal evidence suggests that this is a potentially important trade.

5.1 Import tariffs on biofuels

In its Roadmap, the Commission commented frankly: "From a trade perspective, the EU maintains significant import protection on some types of biofuels, notably ethanol which has a tariff protection level of around 45 percent ad valorem. Import duties on other biofuels – biodiesel and vegetable oils – are much lower... If it would appear that supply of sustainable biofuels to the EU is constrained, the EU should be ready to examine whether further market access would be an option to help the development of the market" (Commission of the European Communities, 2007a: 7).

Bioethanol is traded as either undenatured or denatured alcohol, with a most favoured nation (MFN) tariff rate of €19.2 or €10.2 per hectolitre, under heading 2207.10 or 2207.20. However, over the 3-year period 2002–04, 61 percent of ethanol imports (some of which were for beverage or industrial use) entered the EU duty free under three main schemes – super-GSP, Everything but Arms, and the Cotonou Agreement for the ACP States – under no quantitative restrictions (Commission of the European Communities, 2006a: 26–7). The International Food and Agricultural Trade Policy Council, citing a report from the European Union of Ethanol Producers, suggests that Brazilian fuel ethanol had been imported into Sweden under HS 3824.90.99, with a 6.5 percent ad valorem duty, justified because of a higher level of denaturing (IPC and Renewable Energy and International Law, 2006: Endnote 30).

Not only are companies investing in new plant to take advantage of EU farm production, but also they are investing in ports. For example, in September 2008, Welsh Power announced plans for a new £140 million biomass facility in Newport, South Wales, located in the disused South Dock, and supplied by boat with wood chips and energy crops.[29] Some imported vegetable oils have been used for electricity generation.

Bioethanol could be included in a new free-trade area agreement with Mercosur (comprising Argentina, Brazil, Paraguay and Uruguay). As the Commission (2006a: 14) notes: "Sugar and bioethanol are Brazil's main offensive interests and are therefore essential elements of these negotiations." The European Union of Ethanol Producers, in an Issues paper on its website, suggests that the EU's offer to Mercosur was for a tariff rate quota of 1 million tonnes of fuel oil, which it contrasted with the present market size of just 500 000 tonnes.[30]

Biodiesel faces an MFN import tariff of 6.5 percent under Customs Code 3824.9099; but in February 2006, the Commission (2006a: 26) reported that there was "no significant external trade, since the EU is by far the world's biggest producer". The European Biodiesel Board (EBB) subsequently complained of "dumping" by the USA, an issue that we discuss further below. Another relevant consideration is that product will be imported as vegetable oil rather than biodiesel. Crude palm oil, for example, for technical or non-food industrial use enters the EU free of import duty under Customs Code 1511.10; and crude soybean oil with a tariff of 3.2 percent.

As and when the Doha Round is concluded, tariffs on bioethanol and agricultural raw materials would face reductions negotiated under the new Doha Agreement on Agriculture. The tariff heading for biodiesel, however, is not included in the list of agricultural products in the existing Agreement on Agriculture, giving it a rather uncertain status in the WTO (Motaal, 2008), and so any tariff reductions would probably be as agreed in the non-agricultural market access negotiations.

5.2 Trade volumes

In Chapter 2 we reported USDA data on the quantities of biodiesel and bioethanol imported into the EU. These data are repeated in Table 10.

Table 10: EU-27 imports of biodiesel and bioethanol expressed as a percentage of the EU'S biodiesel and bioethanol markets

	2006	2007 e	2008 e	2009 f	2010 f
Biodiesel	2.9	12.3	14.9	14.1	14.0
Bioethanol	17.0	37.4	37.7	39.1	35.0

Source: USDA, as reported in Tables 2.4 and 2.5.

e, estimate; f, forecast.

In addition, some EU production of biodiesel is based on imported palm oil and soybeans (and soybean oil). The EU has for a long time been a major importer of soybeans for crushing within the EU, and at one time it was a net exporter of soybean oil. It is now a net importer (Table 11). It may be recalled from Table 4 that the USDA's estimate for the use of soybean oil in EU biodiesel production in 2006 was 800 000 tonnes.

Table 11: EU supplies of soybean oil (1000 tonnes)

	2003–2004, EU-15	2004–2005, EU-25	2005–2006, EU-25	2006–2007, EU-27
From Community-grown beans	99	156	166	228
From imported seed	2749	3062	2810	3010
Imports (extra-EU)	18	190	600	1050
Exports (extra-EU)	782	490	320	670

Source: European Commission (2008a: Table 4.4.4.3).

5.3 B99 imports from the USA

The USDA's estimate of imports of biodiesel into the EU, reported in Table 2.4, was 750 000 tonnes in 2007 and 1 000 000 tonnes in 2008. The larger part of this would seem to have come from the USA. Indeed, the EBB (2008) has claimed that imports of B99 from the USA into the EU in 2007 amounted to 1.05 million tonnes of B99 (a rather larger number than the USDA's) and that in the first seven months of 2008 B99 imports amounted already to 850 000 tonnes.

The underpinning policy allegedly driving this trade is the US subsidy for blending bio- and mineral fuels, dating from 2004. UK policy, by contrast, subsidies the use of biofuels. The EBB (2008) had claimed that the US policy resulted in a subsidy of "up to" $264 per m3 (i.e. of $300 a tonne) by producing a biodiesel mix with only a "drop" of mineral diesel added (hence, B99).[31] B99 was then exported to Europe, where it was eligible for European support schemes, undercutting (so the EBB claimed) European producers.

There were also suggestions that the US had imported vegetable oils that were subsequently exported as subsidized B99 (the so-called "splash and dash" trade). This issue was addressed by the US Congress in October 2008, when it determined that the subsidy would no longer

benefit the blending of products "produced outside the US for use as a fuel outside the US" (quoted by the EBB, 2008). However, the EBB claims that this will do little to stem the trade, as 90 percent of US biodiesel exports are derived from US product.

As a result, the EBB lodged a complaint with the Commission in April 2008, and the latter then initiated both anti-dumping and anti-subsidy investigations against biodiesel from the USA (European Commission, 2008b). Following an investigation, the Commission concluded that US "exports of dumped and subsidised biodiesel were causing material injury to the biodiesel industry in the EU", and accordingly in March 2009 it imposed temporary antidumping and anti-subsidy duties.[32]

The WTO agreements allow WTO Members to take trade remedies in clearly defined circumstances. The WTO Agreement on the Implementation of Article VI of the General Agreement on Tariffs and Trade 1994 allows anti-dumping duties to be charged when foreign firms can be shown to be "dumping" their product in the import market and causing material injury to the firms in the import market. Furthermore, a countervailing duty can be imposed to offset any subsidy granted by the exporting country under Part V ("Countervailing Measures") of the WTO SCM Agreement.

5.4 Two trade policy dilemmas

Economists usually favour the removal of trade barriers and other market distortions and argue for taxes on negative externalities and subsidies on positive externalities, because it is presumed that these measures move the global economy closer to a "perfect competition" optimum. But the dilemma that policymakers face is that the first-best world of perfect competition is not attainable: instead, we operate in a second-best world, and we have no guarantee that removal of one market imperfection will improve global economic welfare. This potential problem is particularly evident from our discussion of EU biofuel policy.

If the use of biofuels is encouraged in one jurisdiction, by tax rebates or mandates for example, and not in others, then there will be a commercial incentive to ship biofuels to the economy where they can benefit from these concessions. Thus, the EU's policies are likely to encourage the import of biofuels that might have been utilized more efficiently in the country of production. This is a particular problem for developing countries that cannot afford the generous concessions offered by the EU, and they might end up importing fossil fuels so that they can export biofuel to the EU. Ideally, all countries should adopt the same incentives for bioenergy production (or, preferably, the same disincentives for fossil-carbon emissions, such as a carbon tax), but as this utopia is unlikely to be realized the EU should give serious consideration to reducing its incentives for bioenergy, thus reducing the commercial gains of engaging in uneconomic (but commercially advantageous) trade.

The US policy of subsidizing the blending of biofuels can also result in economically unsustainable trade flows, as we saw in the preceding section.

The second trade policy dilemma is often remarked upon in the context of EU trade policy. By granting tariff concessions on the import of products from some countries, but not from others, in the context of GSP, economic partnership agreements (EPAs), etc., trade distortions are introduced into the global economy that the preference receiving nations are keen to see maintained. Preference erosion is a tricky issue in the ongoing Doha negotiations, but the appropriate policy response is to wean preference recipients off their dependence on protected markets by importing nations reducing their MFN tariffs. Such tariff reductions could be achieved by concluding the Doha Round.

6. INTERACTION WITH WTO PROVISIONS

There are three issues that we discuss in this chapter. First, how is EU support for biofuels to be treated in the WTO, if the UK's schemes are at all typical? Second, are the EU's proposals on biofuel sustainability compatible with WTO commitments? Third, we briefly discuss technical standards for biofuels and international standardization.

At the outset, it should be stressed that interpreting WTO provisions, and the interplay between various WTO agreements, is a complex endeavour. WTO Members, one can presume, strive to ensure that their policies conform to WTO commitments; but, if challenged, it is a Dispute Settlement Panel (with recourse to the Appellate Body) that must arbitrate. Although there is some element of a body of case law establishing precedents, each case is settled on the specific facts and circumstances that arise. Not all biofuel policies are the same: for example, in the UK there is a road fuel tax rebate and an RTFO, as we saw in Chapter 3, and in the US there has been a tax credit for the blending of biodiesel (see Chapter 5). These provisions will not necessarily be regulated by the WTO in the same way. As yet, there is no direct WTO jurisprudence regarding biofuels, and the literature is sparse but growing; see, for example, IPC and Renewable Energy and International Law (2006) and Motaal (2008), and Charnovitz, Earley and Howse (2008) on proposed social sustainability criteria.

6.1 Subsidies

Subsidies are subject to the SCM Agreement, except as provided for in the Agreement on Agriculture, but both can apply in combination. As noted earlier, the latter's Annex I lists the products subject to the Agreement, and that list does not include the headings under which biodiesel is traded today. Thus, it would appear that biodiesel (but not the vegetable oils and animal fats that go into biodiesel) is not covered by the Agreement on Agriculture.

Article 1 of the SCM Agreement defines a subsidy. Essentially there has to be a cost to the government (e.g. "government revenue that is otherwise due is foregone or not collected"), *or* "there is any form of income or price support in the sense o Article XVI of GATT" *and* "a benefit is thereby conferred". Presumably, if road fuel taxes on mineral oils were objectively imposed as carbon taxes, with non-fossil fuels exempt, then a WTO Member could argue that no subsidy was involved.[33]

The concept of specificity is important (Article 2). It is only if a subsidy is specific (e.g. to an enterprise, industry or region) that the SCM disciplines apply.

Two forms of subsidy are simply prohibited: export subsidies and "subsidies contingent ... upon the use of domestic over imported goods", except as provided for in the Agreement on Agriculture. The EU's biofuel policies as applied in the UK do not seem to be problematic on either score. Kutas, Lindberg and Steenblik (2007: 37) do nonetheless report that the fuel-tax abatement in some Member States operates on a quota basis and that "The objectives of these systems are threefold: to limit the government revenue losses, to control the expansion of biofuels production, and to exclude imports from outside the EU" (author's italics). If operating in this way, such subsidies could fall foul of the SCM Agreement.

Other subsidies are either actionable (Part III of the SCM Agreement) or non-actionable (Part IV). Actionable subsidies are those that cause harm to the economic interests of producers in another WTO Member, and can lead to a WTO dispute or a Member invoking the countervailing measures to offset the effect of the subsidy (as the EU has done against the USA over imports of biodiesel), or both.

For a WTO complaint to be upheld, a complainant would have to demonstrate the harm, showing cause and effect, and it is not entirely clear what case could be mounted against the EU's biofuel policies. The harm that is referred to in

Part III of the SCM Agreement relates to "injury to the domestic industry of another Member", "nullification of impairment" of tariff concessions or "serious prejudice" such as displacement of imports or price undercutting, none of which seems to apply to the EU's schemes (certainly as applied in the UK). The usual complaint about the EU's (and others') biofuel policies is that they increase world food commodity prices, which is not an issue addressed by the SCM Agreement.

However, there are by-products of the biofuel industry. Oilseed rape, when crushed, produces not only oil that can be used for biodiesel but also a protein-rich meal used as animal feed. Thus, the biofuel programme might be seen to increase the domestic crushing industry's market share in oilseed meals, and the net effect of the programme could be a reduction in the price of oilseed meal. Conceivably, this could lead to a charge that it results in "injury to the domestic industry of another Member", but it would be difficult to make the case.

The Agreement on Agriculture

The language of the Agreement on Agriculture is rather different from that used in the SCM Agreement. Instead of "subsidy", it uses the term "domestic support". In particular, Article 6 (headed "Domestic Support Commitments") says: "The domestic support reduction commitments of each Member ... shall apply to all of its domestic support measures *in favour of agricultural producers* with the exception of domestic measures which are not subject to reduction in terms of the criteria set out in this Article and in Annex 2 ..." (author's italics – these words are potentially important in interpreting the Agreement).

For the purposes of this paper, there are two broad categories of support, commonly referred to as the amber and green boxes. Amber box support is constrained, by a total AMS, while the green box (Annex 2 to the Agreement) outlines the circumstances under which policies are exempt from limits to the level of support. For example, they must meet the "fundamental requirement" that they have "no, or at least minimal, trade-distorting effects or effects on production" (Swinbank, forthcoming). Although the current amber box limits are not a binding constraint on the CAP, these constraints will be considerably tightened by any likely Doha Agreement and become binding (Swinbank, 2008).

Annex 3 of the Agreement on Agriculture explains how the total AMS should be *calculated*. Simplifying considerably, it consists of two basic parts: first an AMS should be "calculated on a product-specific basis for each basic agricultural product *receiving market price support*"; second, any "non-exempt direct payment, or any other subsidy not exempted from the reduction commitment" should be included (Paragraph 1; author's italics). Non-exempt direct payments (or subsidies) may be either product-specific or non-product-specific. Subsidies include "both budgetary outlays and revenue foregone by governments or their agents" (Paragraph 2), and market price support is "calculated using the gap between a fixed external reference price and the applied administered price multiplied by the quantity of production eligible to receive the applied administered price" (Paragraph 8). Furthermore, Paragraph 7 specifies that "Measures directed at agricultural processors shall be included to the extent that such measures benefit the producers of the basic agricultural products."

So, how will the EU declare its biofuel policies in the WTO? On-farm investment grants to plant *Miscanthus* or to build anaerobic digesters for biogas production, for example, will doubtless be declared as green box polices. (These policies often support bioenergy production more generally rather than biofuels specifically.) For example, for 2005–06, under Paragraph 11 of Annex 2 (which has the heading "Structural adjustment assistance provided through investment grants"), the EU declared expenditure of €7.3 billion on measures including "Construction of processing, packaging and storage centres and equipment; land improvement (levelling, fencing, etc.); aid for farm modernization granted through subsidies or equivalent interest concessions; purchase of machinery and equipment, animals, buildings

and plantations;" etc. (WTO, 2009: Supporting Table DS:1).

The Energy Crops Scheme, described in Chapter 4, has been declared blue box support: the blue box is a category between the green and amber boxes of direct payments "under production-limiting programmes" based on "fixed area and yields" and under the current Agreement on Agriculture is not subject to expenditure constraints. However, the Energy Crops Scheme has been abolished by the 2008 "Health Check" reform (see Chapter 4), and in any event expenditures are too small to seriously compromise the EU's ability to abide by its commitments in the current Agreement on Agriculture.

The UK's biofuel policies do not appear to grant market price support within the meaning of Annex 3. There is no "applied administered price" and no systematic mechanism to support market prices, although it must be conceded that biofuel policies will tend to increase the farm-gate price of biofuel ingredients.

Should these policies be included in the AMS as non-exempt direct payments or any other subsidy? The UK's Fuel Tax rebate, for example, does involve revenue foregone by government; but the consumer subsidy implicit in the UK's RTFO would not appear to be so covered. As noted earlier, Paragraph 7 of Annex 3 does say that "Measures directed at agricultural processors should be included *to the extent that such measures benefit the producers of the basic agricultural products*" (author's italics). But how is this latter phrase to be interpreted? At the very least, it would presumably exclude subsidies paid on imported products; and arguably it would cover not the full subsidy but only that part of the subsidy that benefited producers, and this would require some economic test. There is the further complication that biodiesel is not a product covered by the Agreement on Agriculture, and so it could be argued that if biofuels are to be included, then the AMS should relate only to bioethanol and not to biodiesel.

It might be expected that the EU would resist including its biofuel subsidies in its AMS calculations, advancing arguments as outlined in the previous paragraph, and if forced to do so would declare only a portion of the government expenditure (or revenues foregone), reflecting the presumed gain to farmers, on crops grown in the EU for ethanol production.

But what if all of the taxpayer and consumer cost of EU biofuel policy were declared as amber box? In Table 12 we attempt a very rough estimate of the magnitude of the potential amber box "cost" of the EU's biofuel policies, should the EU need to declare them as such, based upon support levels in the UK. The European Petroleum Industry Association (2007: 53), based on Eurostat data, suggests that in 2005 "motor fuel demand" for the EU27 amounted to 180 million tonnes of diesel and just short of 110 million tonnes of petrol. The budget/taxpayer cost of using biofuels was set at 20 pence litre (the existing road fuel tax rebate in the UK); in addition, the consumer cost was recorded at 10 pence per litre (less than the RTFO buy-out price, but reflecting the going market rate in November 2008). A 10 percent incorporation rate was assumed, and an exchange rate of €1 = £1. The final figure represents over 16 percent of the EU15's current AMS limit. This would seriously impair the EU's ability to abide by the domestic subsidy constraints of any likely Doha outcome.

6.2 Sustainability criteria

Although the EU's support policies for biofuels do not seem to raise any particular problems with respect to WTO disciplines, the same cannot necessarily be said of its attempt to make that support conditional upon environmental sustainability criteria in the production of biofuels, or even more the European Parliament's attempt to extend this to socioeconomic criteria such as labour standards. To recap from Chapter 2, in order for biofuels to benefit from financial support or count towards targets, they should demonstrate greenhouse gas emission savings of at least 35 percent, and the European Parliament's Committee on Industry, Re-

Table 12: Potential amber box "cost" of the EU's biofuel policies, based on UK data

	Budget/taxpayer cost: tax rebate	Consumer cost through the RTFO	Total cost
£/litre	£0.20/litre	£0.10/litre	
EU-27's use of diesel and petrol, 2005	180 million tonnes of diesel at 0.85 kg/l 110 million tonnes of petrol at 0.72 kg/l = 364 542 million litres		
Cost for 10 percent biofuel inclusion	£7291 million	£3645 million	£10 936 million
For comparison: EU-15's AMS limit			€67 159.0 million
Expressed as percent of the AMS limit, at €1 = £1			16.3 percent

AMS, aggregate measurement of support; RTFO, Renewable Transport Fuel Obligation.

search and Energy had suggested that this figure should have been 45 percent.

This emphasis on process rather than product standards is redolent of other challenges that the WTO system has faced over the years relating to process standards (Swinbank, 2006). The WTO has been very reluctant to admit that ethical or other concerns about how a product was made are at all relevant if there is no physical manifestation of this in the final product.

The problem starts with General Agreement on Tariffs and Trade (GATT) Article III on "National Treatment on Internal Taxation and Regulation". Basically, the requirement is that imported products should be "accorded treatment no less favourable than that accorded to *like products* of national origin in respect of all laws and requirements affecting their internal sale, offering for sale, purchase, transport, distribution or use". Article I, outlining MFN treatment, basically says that there should be no differentiation between origins. A crucial question, then, is what is a like product? Here, the WTO has no firm definition: each case is judged on its merits (for a discussion, see Read (2005) and Charnovitz, Earley and Howse (2008): 10-11).

It would be extremely difficult, however, to claim that a biofuel that showed a greenhouse gas emission saving of 34 percent (and so did not qualify for support) was not a like product with a biofuel that showed a saving of 35 percent (and so did qualify for support).[34] Unless there are some objective criteria that lie behind the figure of 35 percent, it looks to be quite an arbitrary number, which cannot be used readily to differentiate between products. If the European Parliament's view had prevailed, that 45 percent was the appropriate benchmark, then importers could legitimately have asked why 45 percent was the "correct" number rather than the 35 percent that had originally been proposed by the Commission. The inclusion of socioeconomic criteria, as advocated by the European Parliament's industry committee, would have been even more problematic.

Thus, the EU's proposed environmental sustainability criteria are likely to fall foul of the National Treatment provisions for like products enshrined in GATT Article III. The EU would then need to find some other WTO provision that would, nonetheless, enable it to apply its sustainability criteria to imported product. Precedent suggests that it would look to GATT Article XX, headed "General Exceptions". In particular, and subject to the overarching provisions of its Chapeau, this article says that "nothing in this [GATT] Agreement shall be construed to prevent the adoption or enforcement ... of measures: ... (g) relating to the conservation of exhaustible natural resources if such measures

are made effective in conjunction with restrictions on domestic production or consumption".

The overarching provisions are important: the measure must not be "applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade". Although the EU will doubtless strive to ensure that this condition is met, drafting national legislation to be in conformity with these provisions is not a trivial matter.

The language of Sub-paragraph (g), referring to "the conservation of exhaustible natural resources", predates concerns about global warming and carbon dioxide emissions, but the WTO's dispute settlement system might accept them as legitimate concerns. But a dispute settlement panel would probably want to be convinced by the science behind the measures (and again the arbitrary nature of 35 percent might be a problem) and, following the Appellate Body's intervention in the Shrimp–Turtle case, the EU would need to show that it had engaged in meaningful negotiations with its main suppliers in order to determine credible environmental sustainability criteria.[35]

However, there is little, if any, succour in GATT Article XX to allow the EU to apply socioeconomic criteria in determining eligibility for biofuel subsidies or support (for a thorough discussion, see Charnovitz, Earley and Howse (2008)).

6.3 Technical standards

Vehicle engine design and warranties, climatic factors and fuel distribution systems, and existing technical standards for mineral-oil-based transport fuels inevitably mean that there have to be technical standards for biofuels. Differences in technical standards can lead to non-trade barriers, and in the WTO legal system these are regulated by the Agreement on Technical Barriers to Trade.

Although not wishing to belittle the potential importance of technical standards as an impediment to world trade (we note, for example, the comment in the report prepared by the IPC and Renewable Energy and International Law (2006) that "The EU biodiesel standard, while not premised on the use of rapeseed oil, might as well be premised on it"), the issues are more generic in character and are not discussed further in this report.

Suffice it to note that the EU is one of the participants in the Tripartite Task Force (comprising Brazil, the EU and the USA) that, in December 2007, produced a detailed White Paper on Internationally Compatible Biofuel Standards (Tripartite Task Force, 2007).

7. CONCLUSIONS AND RECOMMENDATIONS

It should be recalled that this report did not set out to assess the science and technology, or the economics, underpinning the EU's policy on biofuels. Instead, its objective was to describe the EU's biofuel policies, set in the context of its overall policy framework on renewables and bioenergy, and their interface with the WTO legal system. As a factual report, it draws relatively few conclusions and makes few recommendations.

When governments intervene in markets, they face the risk of generating yet more market distortions. Thus, if some jurisdictions, such as the EU, give financial incentives to use biofuels, for example the road fuel tax rebate and the RTFO in the UK, and others do not, they risk generating trade flows that are motivated largely to take advantage of those discrepancies. Consequently, the EU's imports of biofuels (and of vegetable oils for the production of biofuels) are likely to be larger than they would otherwise be. The preferable, but politically unlikely, mechanism to address this problem would be for all governments to adopt the same (or broadly similar) policies towards biofuels, thus neutralizing any artificial financial advantage stemming from different policy regimes; but as this is an unlikely outcome in the near term, the EU should give due consideration to reducing the financial incentive. It is in any event likely that bioethanol and vegetable oils for biodiesel, produced in sunnier parts of the globe, would have a comparative advantage over competing products produced in the EU.

Tariff preferences also generate distortions in trade flows, as they favour some country suppliers over others; but this is a generic trade policy issue rather than one limited to biofuels. Economists would tend to argue that the appropriate policy response is to reduce the MFN tariff to zero, thereby removing the tariff preference although imposing adjustment costs on countries losing preferential access. If the EU is seriously committed to its biofuel policies, then it should give due consideration to the elimination of all tariffs on biofuels in the global Doha Round package, perhaps in the context of a zero-for-zero deal (it is of course free to unilaterally reduce its tariffs at any time). If there is no successful outcome to the Doha Round, then Brazil is likely to press for a zero-for-zero deal in the proposed free trade agreement between the EU and Mercosur, further marginalizing potential suppliers that do not have preferential access to the EU's market.

The EU's policies to encourage the use of biofuels, certainly as implemented in the UK, do not appear to raise problems in the context of the WTO's SCM Agreement. They do not appear to be prohibited subsidies, as they do not favour domestic over imported biofuels, and they are not paid on export but only on domestic use. Nor would they seem to be actionable: they do not reduce market opportunities for non-EU suppliers. Instead, the complaint is that they tend to increase global food commodity prices, to the detriment of consumers, but this is not a concern addressed by the SCM Agreement.

It is doubtful that the WTO Agreement on Agriculture imposes important constraints on the level of support afforded biofuels in the EU, certainly as implemented in the UK. It would appear that biodiesel is not an agricultural product covered by the Agreement, and so the costs of the policy attributable to biodiesel are arguably outside the remit of the amber box. The UK's policies do not confer "market price support", as defined for the amber box, but they could be construed as non-exempt direct payments to agricultural processors that do confer some benefit on the producers of the basic agricultural product. The EU will probably argue that no amber box support is involved; but failing that, it might concede that taxpayer (but not consumer) costs associated with the domestic production (but not imported) component of its bioethanol (but not biodiesel) programme could be included in its amber box, reflecting the level of support passed back to

agricultural producers (which would not be easy to determine). If the full taxpayer and consumer cost of both bioethanol and biodiesel programmes on imported and domestically produced fuel were included, then initial calculations suggest that this could be a sizeable portion of the EU's current AMS limit, which would perhaps be unsustainable following a successful conclusion to the Doha Round.

The main problem the EU faces with respect to the WTO is over its proposed environmental sustainability criteria for biofuels. It will be very difficult to argue that biofuels with a carbon emission saving of 34 percent are different (i.e. not like products) from those with a 35 percent saving, for example, and thus the National Treatment criterion of GATT Article III would probably be breached. GATT Article XX, on General Exceptions, may offer a way out, but a WTO-compatible set of environmental sustainability criteria would not be easy to craft. At the very least, the package would have to be non-discriminatory, scientifically based, and implemented only after serious negotiations with potential suppliers.

ENDNOTES

1. http://www.neurope.eu/view_news.php?id=83631. Accessed 3 November 2008.

2. It is usually said that conventional petrol engines can run on a mix containing up to 10 percent bioethanol and 90 percent petrol; this would be known as E10. Flexi-fuel vehicles run on a mixture of 85 percent bioethanol and 15 percent petrol (E85). Using similar terminology, a mix of 5 percent biodiesel and 95 percent mineral diesel would be denoted as B5, while a pure biodiesel fuel would be B100.

3. This involves heating the biomass with virtually no oxygen present. Similar processes produce different extractions: for example, gasification of biomass, producing a mixture of carbon monoxide and hydrogen-synthesis gas (syngas), reminiscent of the centuries-old charcoal technology.

4. Biogas would typically consist of 55–70 percent methane (CH4) and 45–30 percent carbon dioxide (CO_2), in contrast to natural gas, which typically is 90 percent methane. To be used as a fuel in a combustion engine, most of the CO_2 must be removed first.

5. Kutas, Lindberg and Steenblik (2007) produced a useful overview of EU policy on biofuels as of mid-2007, with a detailed inventory of the policies then in place in the Member States.

6. Article 3 states that "Member States should ensure that a minimum proportion of biofuels and other renewable fuels is placed on their markets, and, to that effect, shall set national indicative targets". Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport, Official Journal of the European Union, L123, 17 May 2003.

7. Directive 2001/77/EC on the promotion of electricity produced from renewable sources of energy in the internal market, Official Journal of the European Union, L283, 27 October 2001.

8. Bioliquids are basically biofuels used for heating or electricity generation.

9. CEN describes itself as "a business facilitator in Europe, removing trade barriers for European industry and consumers. Its mission is to foster the European economy in global trading, the welfare of European citizens and the environment". http://www.cen.eu/cenorm/aboutus/index.asp. Accessed 16 November 2008.

10. http://ecommittees.bsi-global.com/bsi/controller?livelinkDataID=25950445. Accessed 15 November 2008.

11. http://cgse.epfl.ch/page65660.html. Accessed 15 November 2008.

12. See the comments of Lord Turner of Ecchinswell to the UK's House of Commons Select Committee on Energy and Climate Change on 4 March 2009 (Question 21). http://www.publications.parliament.uk/pa/cm200809/cmselect/cmenergy/uc309-i/uc30902.htm. Accessed 15 April 2009.

13. Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels. Official Journal of the European Communities, L350, 28 December 1998.

14. Directive 2003/96/EC of 27 October 2003 restructuring the Community framework for the taxation of energy products and electricity. Official Journal of the European Communities, L283, 31 October 2003.

15. http://europa.eu/scadplus/leg/en/lvb/l27019.htm. Accessed 15 November 2008.

16. http://www.decc.gov.uk/bioenergy-grants/. Accessed 29 January 2009.

17. In October 2008, the newly created Department of Energy and Climate change took over responsibilities in this area from the Department for Business Enterprise and Regulatory Reform.

18. Ofgem is a UK government agency with the aim to protect consumers. It does this "by promoting competition, wherever appropriate, and regulating the monopoly companies which run the gas and electricity networks". http://www.ofgem.gov.uk/About percent20us/Pages/AboutUsPage.aspx. Accessed 14 November 2008).

19. HM Revenue and Customs, FAQ: Biofuels http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_FAQs&propertyType=document&columns=1&id=HMCE_PROD1_024771#P6_326. Accessed 15 April 2009.

20. Department for Transport, Renewable Transport Fuel Obligation: frequently asked questions. http://www.dft.gov.uk/pgr/roads/environment/rtfo/faq. Accessed 15 April 2009.

21. Ibid.

22. National Energy Foundation. http://www.nef.org.uk/greencompany/co2calculator.htm. Accessed 15 November 2008.

23. http://www.defra.gov.uk/environment/climatechange/research/carboncost/step2.htm. Accessed 15 November 2008.

24. The Memorandum became part of the EU's Schedule of Commitments in the Uruguay Round package agreed in Marrakesh in 1994. For an alternative source, and background, see Commission of the European Communities (1993).

25. This is rather ironic: in its September 2006 review of the scheme, the Commission saw a need to increase the "attractiveness of the scheme for both the farmers and the processors and increase its impact in terms of support to the development of energy crops" (Commission of the European Communities, 2006b: 9).

26. Indeed, the EU's export subsidy constraints fixed by the Uruguay Round Agreement on Agriculture include specific commitments on agricultural alcohol. The expenditure and volume constraints equate to a maximum export subsidy of €83.75 per 1000 hl. Through to 2003–04, this was one of the most used of the EU's export subsidy "entitlements": 89.9 percent of the expenditure and 74.4 percent of the volume "entitlement" was used over this period. However, from 2004-05 no export subsidies on agricultural alcohol have been declared (Author's calculations from EU submissions in the WTO's G/AG/N/EEC/. document series).

27. http://www.defra.gov.uk/FARM/crops/industrial/energy/energy2.htm. Accessed 15 April 2009.

28. "Confirmation of the Details of the Energy Crops Scheme – Information for Applicants". http://www.naturalengland.org.uk/planning/grants-funding/energy-crops/default.htm. Accessed 3 July 2008.

29.http://www.newenergyfocus.com/do/ecco.py/view_item?listid=1&listcatid=94&listitemid=1736. Accessed 3 November 2008.

30. http://www.uepa.be/issues.php. Accessed 17 November 2008.

31. This subsidy of $0.264 per litre equates to £0.175 or €0.206 per litre at the exchange rate of 24 November 2008, somewhat lower than the fuel tax rebate in the UK outlined in Chapter 3.

32. http://ec.europa.eu/trade/issues/respectrules/anti_dumping/pr120309_en.htm. Accessed 15 April 2009. The original notices were published in the Official Journal of the European Union on 13 June 2008 (C147). The customs codes cited, for information only, were CN codes 3824 90 91, ex 3824 90 97, ex 2710 19 41, ex 1516 20 98, ex 1518 00 91, ex 1518 00 99. Note that CN 3824, under which biodiesel is commonly traded, is not an agricultural product covered by the WTO Agreement on Agriculture.

33. Ideally, carbon taxes would be applied on a lifecycle basis.

34. Charnovitz, Earley and Howse (2008: 27) suggest that "criteria that must be met in order for biofuels to qualify as contributing to meeting a mandatory target would, quite clearly, qualify as domestic 'rules, regulations or requirements' within the meaning" of the National Treatment and MFN obligations, but that the issue might be more complex when subsidies are involved. This is because "private economic actors, if they so wish, are free, not to meet the conditions as long as they are willing to forgo the subsidy or benefit". But "private economic actors" in the UK context of the RO and the RTFO also are free not to meet the conditions provided they "buy out" their obligation. The situation is clearly legally complex and unclear.

35. In Paragraph 166 of its report, the Appellate Body had noted "the failure of the United States to engage the appellees, as well as other Members exporting shrimp to the United States, in serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements for the protection and conservation of sea turtles" (WTO, 1998).

REFERENCES

Agra Europe (2006a). "Danish minister ethically opposed to biofuel". *Agra Europe* 12 May: N/1.

Agra Europe (2006b). "Germany set for staged removal of biodiesel tax breaks". *Agra Europe* 7 July: N/3–N/4.

Agra Europe (2007a). "Swedish minister questions ethics of fuel from food". *Agra Europe* 16 January: N/4–N.5.

Agra Europe (2007b). "EU confirms zero set-aside for 2008 harvest". *Agra Europe* 28 September: EP/5.

Agra Europe (2008a). "MEPs urge more focus on non-food biofuel sources". *Agra Europe* 12 September: EP/1-EP/2.

Agra Europe (2008b). "CAP Health Check – detailed summary". *Agra Europe* 21 November: EP/5–EP/8.

Bioenergy RE-Generation Project (2007). *Power Purchase Agreements (PPAs) for Biomass Projects*. Revision 2. Guidance note no. 2. Renewables East. Norwich. UK.

Bomb, C., McCormick, K., Deurwaarder, E. and Kaberger, T. (2007). "Biofuels for transport in Europe: lessons from Germany and the UK". *Energy Policy* 35(4): 2256–2267.

Charnovitz, S., Earley, J. and Howse, R. (2008). *An Examination of Social Standards in Biofuels Sustainability Criteria*. IPC Discussion Paper – Standards Series. International Food and Agricultural Trade Policy Council. Washington DC. USA.

Commission of the European Communities (1993). *Recommendation for a Council Decision Concerning the Conclusion of an Agreement on Certain Oilseeds Between the European Economic Community and the United States of America within the framework of the GATT*. SEC(93)53. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (1997). *Energy for the :Future Renewable Sources of Energy*. White paper for a Community Strategy and Action Plan. COM(97)599. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2006a). *Communication from the Commission: An EU Strategy for Biofuels*. COM(2006)34. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2006b). *Report from the Commission to the Council on the Review of the Energy Crops Scheme*. COM(2006)500. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2007a). *Renewable Energy Road Map. Renewable Energies in the 21st Century: Building a More Sustainable Future*. COM(2006)848. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2007b). *Proposal for a Directive of the European Parliament and of the Council Amending Directive 98/70/EC as Regards the Specification of Petrol, Diesel and Gas-Oil and the Introduction of a Mechanism to Monitor and Reduce Greenhouse Gas Emissions from the Use of Road Transport Fuels and Amending Council Directive 1999/32/EC, as Regards the Specification of Fuel Used by Inland Waterway Vessels and Repealing Directive 93/12/EEC*. COM(2007)18. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2007c). *Communication from the Commission to the Council and the European Parliament: Preparing for the "Health Check" of the CAP reform*. COM(2007)722. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2008a). *Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources*. COM(2008)19. Commission of the European Communities. Brussels. Belgium.

Commission of the European Communities (2008b). *Proposal for a Council Regulation Establishing Common Rules for Direct Support Schemes for Farmers Under the Common Agricultural Policy and Establishing Certain Support Schemes for Farmers*. COM(2008)306/4. Commission of the European Communities. Brussels. Belgium.

Council of the European Union (2007). *Brussels European Council 8/9 March 2007 Presidency Conclusions*. 7224/1/07 REV 1. Council of the European Union. Brussels. Belgium.

Council of the European Union (2009). *Council Adopts Climate-Energy Legislative Package*. Press release 8434/09 (presse 77). Council of the European Union. Brussels. Belgium.

Darling, A. (2008). Open letter to Dr Andrej Bajuk, Ministry of Finance, Slovenia, and fellow EU Finance Ministers, 13 May 2008. HM Treasury. London. UK. http://www.hm-treasury.gov.uk/d/chx_letter130508.pdf. Accessed 31 October 2008.

Department for Business Enterprise and Regulatory Reform (2008a). *Renewables Obligation Consultation: Government Response*. Department for Business Enterprise and Regulatory Reform. London. UK.

Department for Business Enterprise and Regulatory Reform (2008b). *Renewable Energy Strategy Consultation*. Department for Business Enterprise and Regulatory Reform. London. UK.

Department for Environment, Food and Rural Affairs (2005). *Set-Aside Handbook and Guidance for England 2006 Edition*. Department for Environment, Food and Rural Affairs. London. UK.

Department for Transport (2009). "Outcome of the Consultation on the Draft Renewable Transport Fuel Obligations (Amendment) Order 2009". Letter from the Head of CFV Division to stakeholders, 28 January. Department for Transport. London. UK.

Department of Energy and Climate Change (2008). *Reform of the Renewables Obligation: Government Response to the Statutory Consultation on the Renewables Obligation Order 2009*. Department of Energy and Climate Change. London. UK.

Department of Trade and Industry (2007). *Meeting the Energy Challenge: A White Paper on Energy*. CM 7124. The Stationery Office. London. UK.

EurObserv'ER (2008). "Biofuels Barometer". *Journal des énergies renouvelables* 185.

European Biodiesel Board (2008). *Surge in B99 Exports Towards Europe: EBB Asks for Systematic Registration of Biodiesel Imports*. Press release 983/TRA/08. 16 October. European Biodiesel Board. Brussels. Belgium.

European Commission (2007). *Biofuels: Aid Per Hectare of Energy Crops Reduced as the Area Exceeds 2 Million Hectares*. Press release IP/07/1528. 17 October. European Commission. Brussels. Belgium.

European Commission (2008a). *Agriculture in the European Union: Statistical and Economic Information 2007*. http://ec.europa.eu/agriculture/agrista/2007/table_en/index.htm. Accessed 1 April 2009.

European Commission (2008b). *EU Launches Investigation into US Biodiesel Imports*. http://trade.ec.europa.eu/doclib/docs/2008/june/tradoc_139196.pdf. Accessed 24 November 2008.

European Commission (2008c). *The EU Emissions Trading Scheme: 2008 Edition*. European Commission. Brussels. Belgium.

European Parliament (2008a). *Draft Report on the Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources*. Committee on Industry, Research and Energy. 2008/0016(COD). European Parliament. Brussels. Belgium.

European Parliament (2008b). *Report on the Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources*. Committee on Industry, Research and Energy. A6-0369/2008. European Parliament. Brussels. Belgium.

European Parliament (2008c). *EP Seals Climate Change Package*. Background paper from the European Parliament's press office. 17 December. http://www.europarl.europa.eu/news/expert/background_page/064-44005-343-12-50-911-20081208BKG44004-08-12-2008-2008-false/default_en.htm. Accessed 14 January 2009.

European Parliament (2008d). *European Parliament Legislative Resolution of 17 December 2008 on the Proposal for a Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources*. (COM(2008)0019 – C6-0046/2008 – 2008/0016(COD)) (Codecision procedure: first reading). P6_TA-PROV(2008)0609. European Parliament. Brussels. Belgium.

European Petroleum Industry Association (2007). *Annual Report 2007*. European Petroleum Industry Association. Brussels. Belgium.

Eurostat (2008). *EU Energy and Transport in Figures: Statistical Pocketbook 2007/2008*. Office for Official Publications of the European Communities. Luxembourg.

HM Treasury (2008). *Budget 2008. Stability and Opportunity: Building a Strong, Sustainable Future*. HC 388. The Stationery Office. London. UK.

IPC and Renewable Energy and International Law (2006). *WTO Disciplines and Biofuels: Opportunities and Constraints in the Creation of a Global Marketplace*. IPC discussion paper. International Food and Agricultural Trade Policy Council. Washington, DC. USA.

Kutas, G., Lindberg, C. and Steenblik, R. (2007). *Biofuels: At What Cost? Government Support for Ethanol and Biodiesel in the European Union*. The Global Subsidies Initiative. International Institute for Sustainable Development. Geneva. Switzerland.

Mitchell, C., Bauknecht, D. and Connor, P.M. (2006). "Effectiveness through risk reduction: a comparison of the renewable obligation in England and Wales and the feed-in system in Germany". *Energy Policy* 34(3): 297–305.

Motaal, D.A. (2008). "The biofuels landscape: is there a role for the WTO?". *Journal of World Trade* 42(1): 61–86.

Murdoch, G. (2007). "Palm oil puts squeeze on Asia's endangered orangutan". *Reuters*. 28 May. http://www.reuters.com/article/latestCrisis/idUSSP118739. Accessed 9 November 2007.

Oxfam International (2007). *Bio-fuelling Poverty: Why the EU Renewable-Fuel Target may be Disastrous for Poor People*. Oxfam briefing note. Oxfam International. Oxford. UK.

Read, R. (2005). "Process and production methods and the regulation of international trade". In Perdikis, N. and Read, R. *The WTO and the Regulation of International Trade: Recent Trade Disputes between the European Union and the United States*.

Renewable Fuels Agency (2008). *The Gallagher Review of the Indirect Effects of Biofuels Production*. Renewable Fuels Agency. St. Leonards-on-Sea. UK.

Renewable Fuels Agency (2009). *Quarterly Report 2: 15 April–14 October 2008*. Renewable Fuels Agency. St Leonards-on-Sea. UK.

Renewables Advisory Board (2008). *2020 Vision: How the UK can Meet its Target of 15 percent Renewable Energy*. http://www.renewables-advisory-board.org.uk. Accessed 25 June 2008.

Swinbank, A. (2006). "Like products, animal welfare and the WTO". *Journal of World Trade* 40(4): 687–711.

Swinbank, A. (2008). "Potential WTO challenges to the CAP". *Canadian Journal of Agricultural Economics* 56(4): 445–456.

Swinbank, A. (forthcoming). "The reform of the EU's Common Agricultural Policy". In R. Meléndez-Ortiz, C. Bellmann and J. Hepburn (eds) *Agricultural Subsidies in the WTO Green Box: Ensuring Coherence with Sustainable Development Goals*. Cambridge University Press. Cambridge.UK.

Swinbank, A. and Daugbjerg, C. (2006). "The 2003 CAP reform: accommodating WTO pressures". *Comparative European Politics* 4(1): 47–64.

Swinbank, A. and Ritson, C. (1992). *A Guide to EEC Wine Policy*. Horton Publishing. Bradford. UK.

Swinbank, A. and Tanner, C. (1996). *Farm Policy and Trade Conflict: The Uruguay Round and CAP Reform*. University of Michigan Press. Ann Arbor. USA.

Tripartite Task Force (Brazil, European Union and United States of America) (2007). *White Paper on Internationally Compatible Biofuel Standards*. http://ec.europa.eu/energy/res/biofuels_standards/doc/white_paper_icbs_final.pdf. Accessed 5 November 2008.

USDA (2008a). *EU-27 Bio-Fuels Annual 2008*. Foreign Agricultural Service. Global Agriculture Information Network. GAIN report number E48063. United States Department of Agriculture. Washington, DC. USA.

USDA (2008b). *France. Bio-Fuels. Changes Proposed in French Biofuels Incentives 2008*. Foreign Agricultural Service. Global Agriculture Information Network. GAIN report number FR8020. United States Department of Agriculture. Washington, DC. USA.

WTO (1998). *United States: Import Prohibition of Certain Shrimp and Shrimp Products. Report of the Appellate Body*. WT/DS58/AB/R. World Trade Organization. Geneva. Switzerland.

WTO (2009). *Notification* (of the EU's domestic support commitments for 2004/05 and 2005/06). G/AG/N/EEC/59. World Trade Organization. Geneva. Switzerland.

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