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Biofuels and WTO Disciplines

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Given the sharp rise in crude oil prices and growing awareness of climate change, the potential of biofuels, particularly of bioethanol, has become an ubiquitous topic of public debate and has induced ambitious policy initiatives. The latter are mostly paired with protectionist measures as the examples of the European Union and the United States show, where domestic producers of energy crops are put at an advantage thanks to subsidisation, direct payments and/or favourable tax schemes. Moreover, the EU is working out a mandatory certification scheme for ethanol imports, imposing social and environmental standards which constitute another hurdle for more efficiently produced ethanol originating in the Southern hemisphere. A similar path is taken by Switzerland's revised mineral oil tax law which imposes social and environmental criteria which might not only result in a ban of biofuels produced from palm oil, soy and grain, but will also set obstacles for sugarcane-based ethanol which is currently said to be the most eco-efficient biofuel. This paper explores where these policy initiatives are at odds with or at least in a grey area of WTO regulations, and where they disrupt markets without necessarily generating environmental benefits. The findings of our study lead to the conclusion that markets should play a stronger role in expanding the use of biofuels, since many risks affiliated with the biofuel production are caused rather than alleviated by interventionist practices.

JEL Codes: F10, F13, F15, F18
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1 Introduction

The public debate on biofuels has seen waves of enthusiastic support and strong reservations. First praised as the panacea to reduce greenhouse gas (GHG) emissions, biofuel policy now meets strong scepticism with regard to its environmental effectiveness, namely its GHG life-cycle balance and its impact on biodiversity. It is also reproached of leading to negative social consequences such as the displacement of food crops, raising food prices, insecure employment with low income, and high health risks. This has led to a situation where government strategy papers formulate very ambitious goals of substitution, but policy implementation should respect all sorts of environmental and social conditions which will make it practically impos-

sible to meet the targets[1]. Much of the public debate also neglects basic economic reasoning – otherwise it would not come as a surprise that the subsidisation of biofuels leads to increased prices for alternative, that is, alimentary uses of crops, and that biofuel crop production competes for alternative land use.

Another puzzle: The debate is most often gauged in terms of national markets with policy having full control on production and consumption of biofuels, although the underlying demand and supply conditions speak a different language. Demand will be strongest in the developed OECD countries, whereas comparative advantage is in the Southern hemisphere. Very few studies consider international trade in biofuels and the majority does not even touch the question whether the proposed policies are compatible with WTO law, with the notable exception of a report of the International Food & Agricultural Trade Policy Council (Howse et al. 2006) and a paper by Switzer (2007).

Section 1 gives a brief summary of biofuel markets and policies. Section 2 outlines the relationship between biofuel and agricultural markets. Section 3 discusses relevant WTO disciplines, with section 4 analysing the WTO compatibility of the recent changes in the Swiss Mineral Oil Tax. Section 5 draws some general policy conclusions.

2 Biofuel Markets and Policies

2.1 Market Trends

Ethanol is currently the major biofuel, with Brazil and the United States accounting for over 70% of total world production. Ethanol production in Brazil is mainly based on sugarcane, whereas corn is the dominant feedstock in the United States. Some other countries, such as India and China,

1 EU policy is a good case in question. The Commission's most recent comprehensive initiative, the energy and climate-change package of 10 January 2007 (COM 2007a) establishes a target of 20 percent of all EU energy consumption to come from renewable sources by 2020, and 10 percent of the petrol and diesel market to be supplied from biofuel sources by 2020, goals which have been endorsed by the spring meeting of the European Council in Brussels on 8–9 March 2007. On the other hand, the public debate on environmental and social risks is gaining momentum, and the European Parliament, in its resolution taken on 14 December 2006, pays particular attention to sustainability criteria, including not only environmental, but also economic and social sustainability (para 16), and asks the Commission to establish "a mandatory and comprehensive certification scheme" applicable to biofuels from EU and imported sources (para 45) (EP 2006). The European Commission is currently developing sustainability criteria for biofuels (see *infra* 4.4). Whether a feasible trade-off between these two goals can be achieved is debatable.

are also taking increased interest in ethanol production and have ambitious plans for increasing capacity. Biodiesel, the other major biofuel, is lagging behind because of higher feedstock costs. However, its production is significant in the European Union, particularly in Germany and France, and gaining importance in Asian and Latin American countries.

Brazil played a pioneering role in the field of alternative fuels: the "Proálcool" programme launched in 1975 stipulated that most vehicles run on bioethanol or on a compound of petrol and ethanol, and introduced several subsidy programmes (SCHMITZ 2006). The country retained its leading role in the ethanol market even after substantially reducing direct subsidisation. According to estimates of the International Energy Agency (IEA), the country covers 13% of its fuel consumption with ethanol (HIERSTEIN 2007) and has for a long time been the world's main producer of ethanol. It has only recently been overtaken by the United States: of the world's estimated production of 50 bio. litres in 2006, approximately 19.15 bio. litres of ethanol originated in the United States compared to 16.7 bio. litres produced in Brazil (GATTERMAYER 2006).

The United States considerably enlarged their production capacities in the last seven years, having started with 54 bioethanol plants in 2000 and now disposing of 100 plants which are mainly located in the agricultural states of the Midwest (U.S. 2006). These have a combined capacity of 18.2 bio. litres annually to which have to be added another 8.6 bio. litres by the end of 2007 due to projected plants (GATTERMAYER 2006). The steep increase of U.S. capacity is the result of strongly rising crude oil prices combined with a fixed subsidy which was keyed to an average price of oil of $20/barrel (TYNER 2007).

Asia has produced 6.6 bio. litres of ethanol in 2005, an output which should increase significantly with the implementation of China's plans: already Asia's major producer of ethanol (KOIZUMI and OHGA 2007), the People's Republic intends to invest $2 bio. in the ethanol production, whereof the bulk will be used for the construction of 246 production plants (GATTERMAYER 2006). Malaysia, on the other hand, is about to take the lead in the global biodiesel market, since the government has recently granted licenses for 90 biodiesel plants which will yield an annual capacity of 3.8 bio. litres (KOIZUMI and OHGA 2007).

Current trade in biofuels is modest compared to total production, although regional production and consumption patterns as well as comparative advantage would speak for high trade flows: Consumption volumes are high in the North and competitive advantage for production is in the Southern hemisphere. Costs vary substantially, with U.S. production cost at about 150% of Brazilian equivalents (GATTERMAYER 2006). European costs are substantially higher. Due to its geography and low labour costs, Brazil has a clear cost advantage in the production of biofuels.

Trade statistics must be handled with considerable care, though, because they do not always distinguish fuel ethanol from other uses. A reasonable estimate is that in 2005, trade covered approximately 10% of the world's production (DOORNBUSCH and STEENBLICK 2007 based on WALTER et al. 2007) Brazil is the main exporter of ethanol, providing 48% of world wide ethanol exports in 2005, while no other country provided more than 10% (WALTER et al. 2007). Among the major customers of Brazilian ethanol ranks Japan which received 11% of global imports in 2005, thus being the world's second largest importer of ethanol, only surpassed by the U.S. with 18% (WALTER et al. 2007).

After this short survey on markets, a note on regulatory policies complements the overall picture. Given that ethanol is already well established as a fuel, Brazil's policies are less intricate. Its main supporting measure consists in the provision that gasoline needs to contain a minimum percentage of ethanol (SANDALOW 2006). In addition, government grants tax preferences for the purchase of new flex-fuel vehicles (SANDALOW 2006). Direct subsidisation of sugarcane production is concentrated on the North-Northeastern part of the country where a subsidy addresses the comparatively higher production costs in order to mitigate migration to the Centre-South (MARTINES-FILHO et al. 2006). Furthermore, the domestic ethanol market is influenced by excise taxes under the ICMS scheme *(Imposto sobre Circulação de Mercadorias e Serviços)*, a not yet homogenised interstate tax: the ICMS is levied on goods and services that have been produced and sold in distinct states, thus providing a loophole to avoid high taxes (MARTINES-FILHO et al. 2006). Lastly, tariffs for ethanol imported from abroad amount to 30 percent, for sugar to 20 percent (SANDALOW 2006). Biofuel policies in the U.S. and the EU have stronger impacts on market forces and shall be analysed in more details below.

2.2 Protectionist Bias of U.S. Biofuel Policies

The regulatory framework of the U.S. puts domestic producers at a substantial advantage and is based on four main pillars: Subsidies to corn producers (under the Farm Security and Rural Investment [FSRI] Act of 2002, in particular the Loan Deficiency and Countercyclical Payments); a variety of grant and guaranteed loan programmes on federal and state level to ethanol producers; tax credits to ethanol processors (via the U.S. government ethanol tax credit programme which corresponds to a subsidy of 51 cents per gallon of ethanol blended with gasoline); and tariffs on imported ethanol (introduced in 1980 with the Omnibus Reconciliation Tax Act which is currently set at 54 cents a gallon)[2]. Member countries of the Caribbean Basin Initiative (CBI) may export a limited quantity of ethanol duty-free to the United States, meaning that ethanol produced from at least 50% local feedstock may be imported duty-free, and up to 7% of the U.S. market may be supplied duty-free by CBI ethanol containing no local feedstock. Although this 7% cap was not met in 2006, it is expected that especially Brazilian ethanol might increasingly gain duty-free market access via dehydration plants in CBI countries like Trinidad and Tobago, or El Salvador (YACOBUCCI 2007).

KOPLOW estimated the overall subsidies provided for ethanol to currently fall within the range of $5.1 to $6.8 bio., which corresponds to a range of $1.05 and $1.38 per gallon of ethanol or between $1.42 and $1.87 of gasoline equivalent (YACOBUCCI 2007).

In addition to protecting the ethanol market by means of tariffs and subsidies, ethanol as an alternative fuel is furthermore supported by federal[3] legislation promoting the use and production of ethanol directly and relating to factors of production. In first line stands the Energy Policy Act of 2005 which established a purchase mandate for liquid biofuels in the course of the renewable fuels standard (RFS)[4]: Under the RFS, annual production of gasoline is required to contain ethanol or other renewable fuels, starting with 15.12 bio. litres (4 bio. gallons) in 2006 and going up to 28.35 bio. litres (7.5 bio. gallons) in 2012. Support for factors of production is partly granted through capital grants, funding for demonstration projects or regulatory

2 Concise overviews on U.S. ethanol policies can be found in: HAHN and CECOT (2007), KOPLOW (2006), MIRANOWSKI (2007), TYNER (2007) and YACOBUCCI (2006).

3 In addition to federal law, several states have implemented support schemes for the production of ethanol. While this paper is not dealing with legislation on state level, an overview of subsidies and regulations in the different states is given by KOPLOW (2006).

4 See: KOPLOW (2006), ZARRILLI (2006), U.S. (2006) and YACOBUCCI (2006).

exemptions, which are all measures mainly taken on state level (KOPLOW 2006).

2.3 EU Mandate for Biofuel Policies of Member States

In the European Union, objectives and the general framework for biofuel policies are decided on Union level, whereas implementation relies heavily on Member States[5]. Already in 1997, the Commission declared in its White Paper on "Energy for the Future: Renewable Sources of Energy" (COM 1997) that the Member States shall aim at doubling the share of renewable energy sources until 2010, starting from a penetration rate of 6%. The Commission's most recent initiative, the energy and climate-change package of 10 January 2007 (COM 2007a, COM 2007d) established the target of 20% of all EU energy consumption to come from renewable sources by 2020. Biofuels have received particular attention, because they represent one of the few renewable fuels for transport. Meanwhile, the EU has become the world's main producer of biodiesel, with an annual production of 2 mio. tonnes (COM 2007d, 23). Priorities, however, have shifted to promoting bioethanol. In contrast to the United States, instead of corn mainly sugar beet, wheat, rye or rapeseed is processed into ethanol (SCHMITZ 2006).

In order to boost the consumption of renewable fuels in general, Directive 2003/30/EC mandates that Member States have a minimum proportion of biofuels and other renewable fuels on the market, setting as the Union's objective a share of 5.75% in 2008 in the national markets (Art. 3.1.b.ii)[6]. Concrete aide in pursuing this objective is provided by Directive 2003/96/EC which allows Member States to apply total or partial excise tax exemptions to, *inter alia,* biofuels. On the production side, so-called energy crops, that is, crops that are used for the production of biofuels, profit from a premium of 45 Euros per hectare, with a maximum guaranteed area of 1.5 mio. hectares (COM 2006). Besides the mentioned premium, producers benefit from the set-aside obligation as stipulated by the Common Agricultural Policy (CAP): farmers receive payments for land "set aside", notably land that is not cultivated with food-crops for a certain period. However, they may grow non-food crops – including energy crops – in these areas, if the use of the biomass is guaranteed either by a contract or by the farmer himself (COM 2006).

5 SCHLEGEL and KAPHENGST (2007) give a short survey on EU biofuels policy; see also KUTAS et al. (2007).
6 Originally, this goal had been set for 2010, but due to the fast development of the European biofuel production it had been revised; see GATTERMAYER (2006).

Excise tax reductions and subsidies play an important role in government support for biofuels on Member States level. According to KUTAS et al. (2007) such support amounts to around 3.7 bio. Euros in 2006, of which excise tax exemptions make up the lion share (3 bio.) (KUTAS et al. 2007 and SCHLEGEL and KAPHENGST 2007). Nevertheless, support and growth in biofuel use is very uneven among Member States, with Sweden, Germany, and to a lesser extent Austria, France and Lithuania in the lead.

3 Biofuels and Agricultural Markets

There has been much public debate on the impact of biofuel policies on markets for agricultural products and land use – with a negative connotation: Increased production of biofuels leads to higher food prices with negative social consequences and to an increased demand for land use in form of monocultures with adverse effects on biodiversity. These risks are real, but they are to be expected from simple economic reasoning. To evaluate biofuel policies, it is useful to have a clear understanding of some critical substitution effects.

3.1 Substitution Effects between Fuel and Agricultural Markets

First, there is a close substitution between hydrocarbon fuels and biofuels. Ethanol can be easily blended with gasoline below a level of a 10 percent mixture[7], and biodiesel is freely substitutable to regular diesel with traditional engines. Technically, biofuels and hydrocarbon fuels are close substitutes. Given that biofuels are and will remain a small fraction of total hydrocarbon fuel consumption, it is fair to assume that global crude oil prices will be determined by forces outside biofuel markets and can be assumed to be exogenous determinants of biofuel prices. These in turn determine demand prices for energy feedstock. For feedstock with dual use (that is, food and energy production), as for example, sugarcane, corn, and cereals, crude oil prices have a direct impact on prices for agricultural food products and they define a kind of lower price floor. The margin depends on production costs of the respective biofuels, which again are contingent on feedstock used, technology, scale of the operation, and wage costs. Brazilian ethanol from sugarcane seems to be competitive with today's high oil prices without fur-

7 Higher mixtures require an adaptation of engines and separate pump stations which both have high set-up cost. The flex fuel engines work on the E-85 standard, an 85 percent mixture of ethanol with gasoline.

ther subsidisation. As mentioned above, the strong increase in U.S. ethanol production was mainly the result of the oil price hike, combined with a subsidy which was keyed to an average price of oil of $20/barrel (TYNER 2007). There are also voices indicating that, at today's crude oil prices, we would see substantial biofuel production in the U.S., even without subsidisation – although on a lower scale and with lower growth rates (SCHMITZ, MOSS and SCHMITZ 2007 and MIRANOWSKI 2007). European biofuel production would not be competitive on equal terms with hydrocarbon fuels. This applies even more so to biofuels from cellulosic sources like switch grass, poplar trees, corn stover, or any other plant material containing cellulose, which would not be directly competitive with food production and would have better environmental impacts.

A subsidy either for biofuel consumption or production compensates for cost disadvantages, but leads directly to an increased willingness to pay for the needed feedstock and, hence, to higher prices for agricultural raw materials, be it corn, sugarcane, palm oil, or other raw materials. As MIRANOWSKI (2007) says with regard to the United States: "… in the longer run the price of gasoline and the VEETC [excise tax credit for ethanol] are the major determinants of what ethanol producers can pay for a bushel of corn" (p. 5). If these crops are used as inputs for other food sectors, as with corn in meat production, the price effect can spill over into a broad food basket[8]. Although there are differences in detail, this price effect comes regardless of the form in which the subsidy is granted: excise tax exemptions, direct subsidies to biofuel production, or subsidies to feedstock production earmarked for biofuel use. If one wants to mitigate the negative price effects of biofuel subsidies on food prices, the subsidy must vary inversely with crude oil prices. In the extreme, if crude oil prices are high, a tax on biofuels might even be appropriate to shield food prices from oil market developments[9].

The second substitution effect concerns land use. If certain crops earn higher prices as feedstock for biofuel production, they become more profitable and crowd out alternative use of land. A price increase for energy crops translates into higher land prices. This price effect can be mitigated if idle land is re-cultivated, but efficiency arguments speak for the use of high yield

8 A much cited study by TOKGOZ et al. (2007) calculates that a 30 percent higher corn price increases all average food prices by 1.1 percent. To compare: corn prices have nearly doubled in 2006 alone and future contract prices for deliveries into 2010 are over $4.00 per bushel. See MIRANOWSKI (2007).

9 ELAM (2007) is very critical of grain-based ethanol and claims that grain-based ethanol production should be taxed not subsidised, given prospective global food demand, energy costs, and the profitability of grain-based ethanol production. He refers to China where the use of corn to produce ethanol is banned (to this point see also AVERY 2007). The two sources are commented in SCHMITZ, MOSS and SCHMITZ (2007).

land for biofuels. Competition for land can have environmental effects which go beyond price impacts. If the shift in land use entails a change from diversified agricultural production to monocultures, biodiversity is at risk. If increased profitability of energy crops leads to deforestation, the GHG balance might even become negative, because forests are important carbon dioxide sinks. The same applies for the cultivation of wetlands.

In addition to these general substitution effects, we should be careful of international distortions caused by national biofuel policies which produce strong external effects on other countries. Biofuel policies usually have a nationalist bias, with objectives ranging from reducing dependency from oil imports and, hence, contributing to national security, to farm income support and rural development. What is often neglected in such discussions are international repercussions. On the one hand, protectionist policies reduce market potential for more efficient foreign biofuel producers and deprive countries like Brazil of income opportunities[10]. On the other hand, the induced increase in feedstock prices of export crops translates into higher world market prices, with the increase in U.S. corn export prices as a prime example.

3.2 Empirical Results for Market Reactions

This short introduction into substitution effects makes it obvious that biofuel policies of large countries lead to price responses in many other markets. The quantitative effects depend crucially on the elasticity of demand and supply for energy and food products, the precise framework of biofuel promotion schemes, and regulations for land use. For the U.S. ethanol policy, we find a number of recent econometric studies which come to mixed conclusions. A selection includes: de Gorter and Just (2007a, b, c), Elobeid and Hart (2007), Gardner (2007), Hahn and Cecot (2007), Miranowski (2007) and Schmitz, Moss and Schmitz (2007). Much less is known about the quantitative effects of European biofuel policies. A report of the OECD Round Table on Sustainable Development (Doornbusch and Steenblik 2007) provides valuable information on economic and environmental consequences of biofuel policies on a global scale.

10 This would not be the case for a non-discriminatory market support payment (that is, direct sales subsidy or excise tax credit) which is granted regardless of the origin of the processed biofuel and which is not counteracted by a corresponding import duty as this is the case for the U.S. regime.

Although results vary with differences in models and parameter assumptions, we can draw some general conclusions from these studies:

a) The potential of biofuels to replace hydrocarbon fuels in total road transport is very limited by the availability of suitable land for crops (first generation biofuels) or very high costs of transformation for cellulosic material (second generation biofuels). According to the International Energy Agency's World Energy Outlook 2006 (IEA 2006), global production of biofuels amounted to roughly 1% of total road transport fuel consumption in 2005. Given the rapidly increasing transport volume in emerging countries and the limited availability of suitable land, this share cannot rise substantially. Estimates for the U.S., for example, see a production ceiling at about twice the actual level because competition for land would increase corn prices sufficiently to choke off further investment in the biofuel industry (Tyner 2007).

b) Ethanol production in Brazil has the lowest costs and is economically viable without subsidies even at crude oil prices at a level of $30–40 per barrel. U.S. production could compete at today's crude oil prices without subsidisation, but needs strong protection against Brazilian imports[11]. All other sources need subsidisation of varying degree to compete with gasoline and diesel, even at today's high prices. Given the substantial cost differences, biofuel production in developed countries does not only need subsidisation to compete against traditional fuels, but also high protection to shield against lower cost imports from Brazil (and potential new suppliers from tropical regions[12]).

c) Strong demand for biofuel feedstock, supported by high crude oil prices and substantial subsidisation, will put pressure on farm commodity prices. The OECD expects food prices to rise between 20% and 50% over the next decade with biofuel demand being one component of this increase (OECD and FAO 2007). Price pressure will be most pronounced for direct substitutes to fuel production (that is, sugar, grains, oilseeds), but it can also extend to other crops which compete for land use. Elobeid and Hart (2007) calculated the effect of a $10 per barrel increase in the crude oil price on

11 De Gorter and Just (2007c) show that the combination of the non-discriminatory excise tax exemption with a compensating tariff overtaxes Brazilian imports and provides a strong protection for U.S. producers. Without this protection, U.S. production would be very low or non-existent. This calculation, however, does not take into account price increases in Brazil which were to be expected if demand for Brazilian ethanol would rise substantially – again due to competition for land.

12 The OECD Roundtable sees potential especially in South America and in some African countries. Doornbusch and Steenblick (2007).

U.S. ethanol production and induced price changes for major agricultural commodities. According to their results, as U.S. corn accounts for about 40% of global production and roughly 70% of world trade, the impact on world markets is substantial. The price impact on food baskets around the world is 5% or higher for the majority of countries. The impact is more severe for Latin American and Sub Saharan countries whose diet is based on grain, while Asia relies on rice. With due reservation to the precise figures, which depend on assumptions on demand and supply reactions, one can firmly say that crude oil prices and biofuel policies have become important factors in the functioning of agricultural markets[13].

d) Most relevant studies evaluate U.S. ethanol policies critically[14]. With rising oil prices, the incentives to convert food crops into fuel crops have become very strong, with windfall profits for ethanol producers and high price effects on food and land. The overall welfare effects are expected to be negative. In addition, the protectionist bias favours U.S. corn over Brazilian sugarcane ethanol, with the former having a much lower GHG efficiency (see below) and much higher costs. It is an inefficient way of reaching GHG targets, and sets a very high price for greater self-sufficiency (De Gorter and Just 2007c).

e) The OECD Round Table reports estimates for public support per litre equivalent of fossil fuels replaced and per tonne of CO2-equivalent avoided for the United States, the European Union, Switzerland, and Australia (Doornbusch and Steenblik 2007). The numbers are outraging: In several cases, the use of biofuels is roughly doubling the cost of transportation energy for both consumers and taxpayers. A tonne of avoided carbon dioxide costs well over $500; far exceeding the market price for CO_2 offsets in the emissions trading system. The implication is that one could have achieved far greater reductions with the same amount of money by simply purchasing emission rights without using them.

Some remarks on environmental efficiency conclude this section[15]. First, GHG efficiency: What do biofuels contribute to GHG reduction compared to fossil fuels over the entire life-cylce (the so-called well-to-wheel analysis)? Although calculations are very complex and need assumptions on

13 Similarly Doornbusch and Steenblick (2007).

14 See: Gardner (2007), De Gorter and Just (2007a, b, c), Hahn and Cecot (2007) and Schmitz, Moss and Schmitz (2007).

15 Bräuninger, Leschus and Vöpel (2007) provide a useful summary of the environmental effects on the different stages of production and distribution of biofuels.

energy embedded in the fertiliser used to grow the crop, in water use, in the gathering and transporting of the feedstock, and in the transformation process itself, available evidence suggests a clear ranking between the different technologies: ethanol from sugarcane (Brazil) has the highest potential with up to 90% reduction, followed by biodiesel from rapeseed (EU, 50%), biodiesel from palm oil (Malaysia, 35%) and ethanol from grain (U.S., 20–30%). Ethanol from cellulosic feedstock is expected to be in the range of 70–90% GHG reduction[16]. These estimates are made under the assumption that the expansion of land use does not lead to de-forestation or the cultivation of wetland. In these cases, the GHG impact is most probably negative, because forests and wetlands are important carbon dioxide sinks. The impact on biodiversity is a second environmental criterion widely used: here, biodiesel from palm oil fares worst, because it replaces tropical biodiversity with monocultures. Zah et al. (2007) of the Swiss materials science and technology research institution EMPA have performed a full life-cycle assessment of biofuels and compared the environmental effects with those of transport fuels from petroleum and natural gas. For most biofuels the overall environmental impact is worse than the one for petroleum and natural gas, with adverse effects from agricultural production outweighing the gains in GHG emission of vehicle operation. One has to concede, however, that the adverse effects from agricultural production are measured against a zero baseline and not as difference to alternative agricultural use.

To summarise this section: biofuels have experienced a strong boost over the past few years, particularly in Brazil and the U.S., partly as a result of supporting policies, but just as much as a consequence of rising crude oil prices. Biofuel production has become an important factor in agricultural markets. Quantitative assessments of benefits and costs come to mixed results. There is strong evidence that policymakers should be careful when increasing support for biofuels.

4 Biofuel Policies and WTO Disciplines

Support schemes for biofuels as established by the United States and the European Union have been eyed suspiciously not only by those generally cautioning against the current biofuels hype for environmental or ethical reasons. It has likewise been questioned whether already implemented schemes as well as projected programmes are consistent with multilateral trade

16 All figures from Doornbosch and Steenblik (2007).

agreements. Notably the International Food & Agricultural Trade Policy Council (IPC) has commissioned a survey, *inter alia* by the renowned WTO expert ROBERT HOWSE, on what practices and regulations might breach international trade law[17].

One reservation should be made at the outset. Up to now, there have not been any biofuel WTO disputes. Whereas some conclusions seem obvious (for example, non-compatibility of discriminatory taxes which set different rates for domestic and foreign products which are otherwise identical), many situations are not clear cut and have to await respective jurisprudence of the Appellate Body (notably certification schemes for production). The section proceeds as follows: we will first analyse classification and tariff issues. The second paragraph will look at subsidy provisions, followed by a subsection on WTO disciplines for tax regimes. The subsequent section looks into the WTO compatibility of certification schemes which are heavily discussed in Europe. The chapter concludes with a look at the GATT exception clauses and a short note on the applicability of the Agreement on Technical Barriers to Trade (TBT).

4.1 Classification of Biofuels and Tariffs

Tariff bindings are negotiated according to the Harmonised Commodity Description and Coding System of the World Customs Organization (HS classification). For biofuels, the classification is not only relevant for tariff bindings, but has also broad implications for the applicable subsidy regime: the latter differs if a good is classified as an industrial or an agricultural product. The Agreement on Agriculture (AoA) defines in Annex 1 the coverage of its rules and refers to the HS classification. According to the exhaustive list of agricultural products provided in the aforementioned Annex, the AoA is applicable to bioethanol (HS chapter 22). By contrast, biodiesel (HS chapter 38) which could be regarded as a similar (though not necessarily "like" product, since it requires different adaptations of the engine and thus covers a different consumer market) is classified as an industrial good. This distinction is due to the fact that the HS classifies goods based on their chemical conception and not on their potential use (HOWSE et al. 2006). Ethanol thus ranks as an agricultural product regardless of its intended non-fuel or fuel use, while biodiesel, which is not a dual-use product, can only be

17 HOWSE et al. (2006). In the following, we will rely heavily on this report.

imported as an industrial product. If WTO Members wanted to change this inconsistency, they would have to amend Annex 1 of the AoA by consensus.

The implications for subsidy regimes will be discussed in the next paragraph. Before, we want to highlight some tariff issues. First, differences in tariff rates between ethanol and biodiesel can create distortions in relative prices between the two sources of bioenergy for transport use. If countries wanted to reduce this imbalance, they would be free to adjust the higher tariff to the lower rate, but an adjusted tariff cannot exceed the binding of the preferred rate. It could be helpful to re-define the HS classification to better reflect the end use, although this is not an easy process[18]. Is has also been discussed to treat ethanol for fuel use and biodiesel as environmental goods and to negotiate substantial tariff reductions in the Doha Round as it was envisaged for this class of goods in the Doha-Declaration (Doha Ministerial Declaration, Art. 31 (iii); WT/MIN(01)/DEC/1)[19]. Due to the general stalemate in the round, negotiations with regard to environmental goods were not encouraging, and existing tariff bindings with substantial tariffs and differences between ethanol and biodiesel will remain for the near future.

Nevertheless, unilateral liberalisation for biofuels is always possible. For biodiesel as a single-use product, Member Countries could just apply a tariff which is below the bound rate. For ethanol as a dual-use product, the situation is slightly more difficult. If countries wanted to reduce tariffs for fuel ethanol without parallel reductions for non-fuel use (in order to keep agricultural protection at its current level), they could introduce a differentiation on a lower level of classification. Countries are bound at the six digit level (ethanol), but they are free to introduce a sub-classification according to end-use at the eight digit HS level. The only restrictions are that no subgroup rate may exceed the bound rate and that the differentiation does not violate Most-Favoured-Nation (MFN) treatment.

The MFN requirement needs some additional comments. There should be no difficulties as long as the categorisation is based on broad product and/or end use criteria. A differentiation needs closer scrutiny if tariff reductions should be made conditional on environmental and/or social standards, because such a proposal could introduce a regional or country bias and be a potential violation of the MFN clause. We do not know of any existing tariff differentiation between various sources of biofuel production, but there

18 Howse et al. (2006) discuss the question at some length.
19 Howse et al. (2006) give a short overview of the early negotiations.

is potential for such a move as the quest for environmental and social requirements in biofuel production has high currency, particularly in Europe. Up to now, there were no WTO disputes which had to deal with precisely this question, but there are cases with some analogy. In *EC – Conditions for the Granting of Tariff Preferences to Developing Countries* (WT/DS/246), Panel and Appellate Body had to decide whether additional preferences to a small group of countries in return for their efforts to combat drug trafficking were compatible with a non-discriminatory application of preferences within the Enabling Clause. The essence of the ruling was that such positive conditionality is permissible if the differentiation is part of a positive response to a relevant development need, if the differentiation is based on objective and transparent criteria, and if all similarly situated developing countries are able to profit from the scheme (SWITZER 2007). Given that *EC – Preferences* had to rule on MFN treatment within the development exception of the Enabling Clause and that it concerned general and not product specific preferences, it is questionable whether production requirements for biofuels would be in conformity with the general MFN principle, but it can not be ruled out. HOWSE et al. and SWITZER give it positive consideration as long as the application is transparent and not origin-specific and the contribution of process requirements to sustainable development is well founded (HOWSE et al. 2006 and SWITZER 2007). An international agreement on production standards would manifest international consensus on sustainability and support the case for respective differentiations.

4.2 Subsidisation and Tax Exemption Schemes

As we have shown above, biofuel production and consumption are heavily subsidised. Therefore, the WTO compatibility of biofuel subsidy schemes will be discussed next. To do so, we have to clarify the relevant agreements. As indicated in the previous subsection, biodiesel is classified as an industrial good, hence, the Agreement on Subsidies and Countervailing Measures (SCM) applies. Ethanol, being classified as an agricultural good, falls under the ambit of the AoA. Nevertheless, according to the Appellate Body decision in *U.S. – Subsidies on Upland Cotton* (WT/DS267/AB/R), the SCM is also relevant as long as the AoA does not contain "an explicit textual indication that otherwise prohibited measures are … justified" (STEINBERG 2005).

While the AoA does contain specific rules on export subsidies as prohibited under Art. 3.1(a) SCM, import-substitution subsidies in the sense of Art.

3.1(b) SCM are not specially treated in the AoA and consequently prohibited under the SCM. With other words, subsidies to biofuel processors contingent upon the use of domestic over imported biofuels or biomass are under any circumstances prohibited. This is significant, since export subsidies, according to HOWSE et al. (2006), are not recorded for ethanol, but import-substitution subsidies might become an issue.

Against this background, we comment on some major subsidy programmes in biofuel markets. First, excise tax reductions or exemptions (European countries) or excise tax credits (U.S.) for biofuels: These constitute a subsidy in the sense of Art 1.1 (a)(1)(ii) SCM, "government revenue that is otherwise due is foregone or not collected (for example, fiscal incentives such as tax credits". However, it would be difficult to make a claim that a general tax exemption, which is available to all end-users and to biofuels from all sources, is "specific" in the sense of Art. 2 SCM and, hence, actionable. Therefore, general tax exemptions for biofuels will not cause difficulties with the WTO regime. This would be different though if the respective regulation contained any clause which restricted the benefits to domestic production because this would constitute a flagrant violation of Art. 3.1(b) SCM.

A more subtle question arises if the tax exemption is restricted to specific biofuels or conditional on sustainability criteria, as this is foreseen for the proposed change in the Swiss mineral oil tax law. Under the subsidy ruling, such criteria could constitute a *de facto* discrimination and favour local inputs over imported ones and, hence, fall under Art. 3.1(b) SCM. However, as HOWSE et al. (2006) propose, the tax could be transformed into an environmental tax based on the environmental characteristics of each fuel and thus would no longer constitute a "financial contribution" pursuant to the SCM. Even so, one would still have to consider whether such a tax is in conformity with the National Treatment requirement of Art. III:2 GATT. We will revert to this question below.

A second broad category of subsidies relates to general agricultural subsidies to feedstock used in the biofuel industry, as corn subsidies in the U.S., or grain, sugar beet or rapeseed subsidies in the EU. These could be challenged as downstream subsidies for biofuels. But as HOWSE et al. (2006) argue, they are not specifically aimed at the suppliers of the biofuel industry and, hence, lack specificity. Nevertheless, they would fall under the "amber box" restrictions of the AoA, because they are tied to the production of specific crops.

Less clear is the case of subsidies which are tied to the production of energy crops as the EC's premium for energy crops of 45 Euros per hectare or set-aside regulations of the EU and the U.S., which allow the cultivation of energy crops on land for which farmers receive payments in compensation for removing the land from use for agricultural crops. On the one hand, there is a good chance that these payments qualify as "green box" measures in the AoA, but they could be actionable as downstream subsidies for biofuels under the SCM. Howse et al. (2006) discuss the different arguments but do not come to a firm conclusion as to their WTO compatibility.

Finally, there is a wide range of subsidies to biofuel producers, for example, subsidised credits for infrastructure, tax credits for specified investments, or direct production subsidies, which would have to stand the test of the SCM, but for which general conclusions are difficult to reach. There is a transfer of funds, they confer benefits and they are specific in the meaning of Art. 2 SCM. But it would have to be shown that they have sufficient adverse effects to justify remedies.

In summary, WTO Members have substantial flexibility to formulate support schemes for biofuels as long as they do not openly discriminate between domestic and foreign sources of supply, and apply general criteria which do not constitute a *de facto* discrimination of foreign biofuels or biomass.

4.3 Tax Systems and National Treatment

As indicated above, tax advantages for biofuels can fall under two different sets of WTO disciplines. If they are formulated as an exemption from a defined tax base, the subsidy regime applies. If the tax regulation differentiates according to explicit objectives of the tax law, it would be difficult to treat these advantages as "foregone government revenue that is otherwise due". In this case, one has to examine whether the tax regulation corresponds to the National Treatment obligation of Art. III:2 GATT. The first sentence of this paragraph demands that imported goods are not taxed, directly or indirectly, in excess of "like" domestic goods. Sentence 2 requires that "taxation on directly competitive or substitutable products not be dissimilar in such a way as to afford protection to domestic production"[20]. The assessment of whether two products are "like" or "directly competitive or substitutable" has been held to be a matter of case-by-case analysis, with the un-

20 Howse et al. (2006), 23, with reference to *Japan – Taxes on Alcoholic Beverages*, WT/DS8/AB/R, WT/DS/10/AB/R, WT/DS11/AB/R.

derstanding that "like" products would be a smaller subset of "directly competitive" products.

Against this background, the following cases for integrating sustainability criteria might be distinguished[21]: a tax regulation which defines sustainability for otherwise identical products by domestic versus foreign origin would certainly be in violation of Art. III:2, sentence 1. The same would most likely be true if the implementation of general criteria would use a block acceptance for domestic products and a case-by-case evaluation for imported identical biofuels. Less clear is a situation where biofuels from a specific feedstock, for example, ethanol from sugarcane, would be subject to additional requirements on a case-by-case basis, and these additional requirements could be met more easily by domestic producers. Examples might be transport emissions in a life-cycle approach to GHG emissions, technology differences in biofuel production, environmental protection regimes in agricultural production, or social conditions of farm workers. In all these cases, one would have to ask whether or not the criteria used are sufficient to make the respective fuels "unlike" in the meaning of sentence 1. If not, foreign producers would have a good chance of challenging the respective tax regulations. Even if the dispute settling organs would accept that the products are "unlike", there is still the question whether a tax on directly competitive or substitutable products is sufficiently dissimilar so as to afford protection to domestic production. Finally, what about identical biofuels from different feedstock which are treated differently according to their life-cycle GHG emission balance or overall environmental impact, for example, ethanol from corn and sugarcane with the latter having a much better GHG efficiency? Or, biodiesel from rapeseed and palm oil with the latter supposedly having a strongly negative impact on biodiversity and deforestation risks?

It is fair to say that most of these questions are unresolved and are awaiting WTO adjudication. Conformity with WTO rules is in all likelihood a more difficult hurdle as many advocates of sustainability criteria are inclined to accept; on the other hand, it should not be impossible to draft a regulation which leaves room for sustainability concerns as long as the criteria are neutral with regard to origin and the effects are not too dissimilar. International consensus on applicable sustainability criteria would be helpful in any case.[22]

21 Howse et al. (2006) and Switzer (2007) provide useful information on the integration of sustainability standards in biofuel tax regimes.

22 For an optimistic interpretation, see Switzer (2007).

4.4 Mandatory Certification Schemes

As referred to in the first section, one of the European Union's major goals is to establish a certification scheme to ensure that biofuels sold on EU markets are produced by both domestic and foreign producers according to selected sustainability criteria. While the European Parliament has only stated in its resolution that the mandatory certificate should include "standards for the cultivation and processing phases as well as for the overall life-cycle greenhouse gas balance"[23], the Commission has meanwhile concluded consultations with NGOs, Member State institutions, representatives of the private sector and Malaysia (COM 2007c) with regard to the design of a biofuel sustainability system (COM 2007b). The Commission is currently evaluating the answers received, whereupon it will probably outline a possible scheme for the European market.

The question arises under what conditions mandatory certification schemes would be compatible with pertinent GATT provisions. One situation can be ruled out at the outset: certification schemes which formulate more restrictive standards for imported biofuels compared to domestic production would violate national treatment and could not be excused by Art. XX GATT. The question is whether facially non-discriminatory regulation can have strongly dissimilar impacts on locally produced and imported biofuels and lead to *de facto* discrimination.

The relevant provision is Art. III:4 GATT which reads as follows: "The products of the territory of any contracting party … shall be accorded treatment *no less favourable* than that accorded to *like products of national origin* in respect of *all laws, regulations* and requirements affecting their internal sale …" (emphasis added). The main questions relate to the meaning of "like products" and "treatment no less favourable". Consequently, the test whether a measure is in violation of Art. III:4 entails two distinct steps[24]. The first is to ascertain whether an imported and a domestically produced good are "like". When the dispute settlement organs come to a positive conclusion, they determine, in a second step, whether the regulatory distinction between the two products results in less favourable treatment[25]. To the first test: pursuant to the Appellate Body's ruling in the Asbestos case (*EC – Asbestos,* WT/DS135/AB/R), which followed the criteria set out in the GATT policy document *Border Tax Adjustment* (1970), the "likeness"

23 EP (2006), para 45.
24 Howse et al. (2006) give a very precise overview.
25 This two step test has been developed in *EC – Asbestos* paras. 101 et seq.

of products is to be established by taking into consideration: a) the properties, nature and quality of products; b) the end-uses of the products; c) consumer's tastes and habits; and d) their tariff classification (paras. 101–103)[26]. While "unsustainably" produced biofuels could not be classified as unlike under the conditions a), b) and d), it is possible to establish a differentiation with regard to consumer's tastes and habits. However, whether such an approach could be upheld if contested before a panel is a question ultimately to be decided by the dispute settling bodies themselves. As Howse et al. (2006) note, "the more remote the distinguishing conditions in the scheme are from features that consumers can associate, if properly informed, with a particular product, the more probable the WTO adjudicator will find that the products themselves are 'like'". As noted above, the finding that imported and domestic products are "like" does not preclude the government from introducing regulatory differences. The complainant would have to establish that the regulatory distinction leads to "less favourable" treatment of imported goods when compared to domestic like products as a whole[27].

Applying these general considerations to environmental sustainability standards, Howse et al. (2006) evaluate different groups of measures. If a measure addresses the environmental impact of biofuels in the importing country, and if the regulation does not explicitly discriminate in favour of domestic products (for example, by mandating that a blending requirement must be met by domestically produced biofuels), it is unlikely that such a measure would violate the GATT National Treatment obligation. More careful drafting is required if a standard seeks to minimise life-cycle carbon emissions, including those from feedstock production and biofuel processing abroad. This raises the question of the so-called product-process distinction as reflected in the unadopted Tuna and Dolphin panel rulings[28], the notion that the GATT does not permit differential treatment of products based on their method of production if such differences do not lead to product specific impacts in the importing country. Although this distinction has been refuted by following Panel and Appellate Body reports[29], standards which apply to foreign production processes need careful drafting. It is important that the regulation is based on a distinction consumers can associate, if properly informed, with a particular product, that the objective has broad international support, that the criteria are transparent and related to the stated

26 Cited by Joshi (2004).
27 Howse et al. (2006), *EC – Asbestos* para. 100.
28 *U.S. – Restrictions on Imports on Tuna,* DS2/R (unadopted 3 September 1991), and DS29/R (unadopted 16 June 1994).
29 For an overview of the case law and an evaluation thereof, see Howse and Reagan (2000).

objectives, and that certification follows accepted and objective procedures. Given the broad international support for carbon dioxide emissions reduction, accepted knowledge on carbon dioxide efficiency of different biofuel feedstocks and production processes, and the availability of internationally accepted life-cycle approaches to environmental management, both HOWSE et al. (2006) and SWITZER (2007) come to the conclusion that well drafted life-cycle standards should not violate the National Treatment obligation of Art. III:4 GATT.

This positive evaluation is less founded for standards which extend criteria to a whole range of social and environmental sustainability objectives, for example, diversified agricultural production, water management, labour rights, or rural development. Here, future WTO case law will have to draw the line between accepted national differences in policy objectives with corresponding regulation and unwarranted discrimination of foreign producers which impairs negotiated market access rights.

Finally, we should note that a regulation which entirely bars the import of unsustainably produced fuels would fall under Art. XI GATT, prohibiting quantitative restrictions.

4.5 Exceptions from GATT Disciplines

For all measures which are not in conformity with GATT disciplines, the GATT contains exception clauses which could apply to biofuel policies. Art. XXI (Security Exceptions) formulates that nothing in the agreement should be construed as to "prevent any contracting party from taking any action it considers necessary for the protection of its essential security interests … taken in time of war or other emergency in international relations". It would be difficult to base a biofuel policy on essential security interests in time of war or other emergencies in normal times, but the situation might be different if foreign supply of fuels would be challenged seriously.

More important for the present discussion are the General Exceptions as provided in Art. XX GATT. Art. XX(b) permits measures which are "necessary to protect human, animal or plant life or health" and Art. XX (g) covers measures "relating to the conservation of exhaustible resources if such measures are made effective in conjunction with restrictions on domestic production or consumption". There is consensus that biofuel policies could

fall under each of the two exception clauses[30], although one has to consider that XX(b) demands a necessity test which might be difficult to defend[31].

Even if a measure can be defended by one of the objectives of Art. XX, they still have to meet the requirements of the *chapeau* which imposes a standard of non-discrimination. Such measures should 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". *U.S. – Shrimp*[32] brought important qualifications which are relevant for biofuel policies (Howse et al. 2006). Unjustifiable discrimination may result from the application of a scheme being too rigid and unresponsive to the conditions in other countries. As long as the policy objectives can be reached, the application should be sufficiently flexible regarding local conditions. Arbitrary discrimination may occur if there is a lack of due process and transparency in the manner in which the criteria of the scheme are applied. The latter has also been translated into the exigency that countries have first to strive for negotiated solutions (Switzer 2007).

Switzer provides a good summary of the potential applicability of Art. XX GATT for biofuel policies:

> "Broadly, it is contended that Article XX does provide a base upon which otherwise identical biofuels could be differentiated in relation to their GHG lifetime emissions. In accordance with the jurisprudence of the WTO Appellate Body, before measures for differentiation are implemented the regulating state should attempt to negotiate with trading partners. In addition, the measure must be 'necessary' and should not be more trade restrictive than is required to achieve the designated goal. There should be flexibility in the implementation of the measure such as to take into account different conditions existing in other countries." (Switzer 2007, p.19)

30 For an overview see Howse et al. (2006) and Switzer (2007).

31 The necessity test demands that there is a real health risk and that the measures in question are either indispensable or that (1) there is a close connection between the measure and solving the health risk and (2) the trade restrictive impact is not disproportionate to the contribution to the health risk (Howse et al. 2006).

32 *U.S. – Import Prohibitions of Certain Shrimp and Shrimp Products,* WT/DS58/AB/R.

4.6 Technical Barriers to Trade (TBT Agreement)

The TBT Agreement regulates mandatory measures that specify the characteristics of products and their related processes and production methods (PPMs). It also contains a code of good practice for voluntary standards. It is important to note that the TBT Agreement goes beyond the non-discrimination norms of the GATT, as it mandates that such regulations do not create unnecessary obstacles to international trade which means that they be not more trade restrictive than necessary to fulfil a legitimate objective (Art. 2.2). In addition, it requires WTO members to use international standards as a basis for their technical regulations (Art. 2.4).

Although the TBT Agreement has far-reaching implications for technical regulations and standards, its importance for biofuel policies is limited. There are few international norms for biofuels, and national regulations for admissible mixtures of mineral fuels and biofuels are not really trade distorting, since fuel processors can easily adapt their blends to national differences. And most importantly, the contentious sustainability standards as discussed above do not fall under the ambit of the TBT Agreement. In this respect, one has to distinguish between "related" or "incorporated" PPMs and "unrelated" or "unincorporated" PPMs, whereof the former affect the end characteristics of a product (Joshi 2004). One could argue that a sustainable production does affect the end characteristics of a product by increasing its eco-efficiency. However, life-cycle based provisions as proposed by the European Parliament are generally regarded as unrelated PPMs. Whether these are covered by the TBT remains a matter of dispute, but the dominating *opinio juris* views them as beyond the TBT Agreement's ambit (Dankers 2003, Joshi 2004 and Switzer 2007). This means that they have to be evaluated in light of the non-discrimination requirements of the GATT.

5 The Reform of the Swiss Mineral Oil Tax Law and Corresponding Regulatory Statutes

The Swiss parliament decided in March 2007 on a revision of the petroleum tax law providing major tax reductions for biofuels. With the amended decree on the mineral oil tax law (Mineralölsteuerverordnung, MinöStV), the Swiss Federal Council puts the revision into force as of 1 July 2008 (Eidgenössisches Finanzedepartement 2008). Thenceforward, biogas, bioetha-

nol, and biodiesel will be exempted from petroleum tax, while natural gas and liquid gas will profit from reduced rates.

The revised law contains two provisions which could cause frictions with existing WTO commitments. First, the Federal Council has the authority to define a yearly quota for tax exempted biofuels, with the obligation to give priority to domestic production. Second, tax reductions can only be granted if the biofuel in question meets eco-efficiency and social criteria. Both requirements have been substantiated in the MinöStV.

Prioritising domestic production could be in conflict with Art. III:2 GATT (equal tax treatment of imported with like domestic products) or Art. XI GATT (ban on import quotas). The proposed solution should be in accordance with WTO law although it has a strong protectionist bias. The tax reduction is applied irrespective of source which guarantees National Treatment according to Art. III:2 GATT. At today's cost relations between petroleum and biofuel products, the government grants full tax exemption for both imported and domestic biofuels. But it has two instruments to control total quantity of tax exempted supplies: if relative prices would shift in favour of biofuels and imports strongly increase (domestic supply has natural restrictions), the government can change to partial instead of total exemption, again applied irrespective of source. In addition, Switzerland has the possibility to increase tariffs, because applied tariffs for ethanol are vastly below the bound rate (0.70 CFR applied versus 35 CFR bound per 100 kg). With regard to the quota system, the Swiss government will introduce a total quota of tax exempted biofuels from domestic and imported sources and define it such that it will not be binding on imports.

Art. 19b para. 1 MinöStV substantiates eco-efficiency. Tax exemption is only available if the biofuel reduces GHG emissions over its life-cycle, that is, from its production to its end use by at least 40 percent compared to fossil gasoline; if it generally does not cause considerably more pollution than fossil gasoline; and if its production does neither endanger rainforests nor biodiversity. These requirements are assumed to be respected for biofuels which are produced from organic waste from agricultural or forest production. All other biofuels need proof of a positive eco-balance. For fuels produced on the basis of palm oil, soy or wheat the general assumption is that eco-efficiency will not be given, but domestic producers and importers respectively have the opportunity to give positive proof (Art. 19b para. 3 MinöStV). Biofuels from sugarcane will only be taken into consideration if

it can be proved that their production does not constitute a threat to the rainforest (EIDGENÖSSISCHES FINANZDEPARTEMENT 2008).

Moreover, the production of biofuels has to meet social minimal standards, meaning that labour conditions have to conform to locally applicable law, at the minimum to Core Labour Standards of the International Labour Organization (ILO; Art, 19d para. 1 MinöStV). The Federal Department of the Environment, Transport, Energy and Communications (UVEK) and the Federal Department of Economic Affairs (FDEA) will craft detailed stipulations on ecological and social standards before the revised law and the related regulations enter into force on 1 July 2008.

How are these environmental and social sustainability standards to be evaluated from a WTO perspective? First, let us make some comments which speak for conformity. The drafters of the decree have been very careful to avoid language which could be interpreted as facial discrimination. The tax advantage is accorded irrespective of source; sustainability criteria are transparent, objective and well focused on stated objectives. The main question will be whether or not the application of these standards will create a *de facto* discrimination. Here, one has to await experience with the handling of applications for tax exemptions. In addition, for many potential conflicts we do not have WTO case law and interpretation will remain uncertain. To illustrate we want to point to some areas of potential conflict:

(1) As long as food substitutes from domestic sources are not tax exempted (for example, wheat, maize), and the main domestic source of supply is organic waste, there is little conflict with National Treatment, because ethanol from organic waste and from food crops are sufficiently dissimilar to be defended as being unlike or not directly competitive. The situation could become more difficult if domestic and foreign biofuel is produced from the same feedstock, but criteria like transports, production methods, or fertiliser use would speak for different treatment (rapeseed might be an example). Here, the question arises whether such differences are a sufficient basis for denying the products' "likeness" (sentence 1) or "direct substitutability" (sentence 2) in the meaning of Art. III:2 GATT.

(2) Difficulties could also arise if the application procedure would create a systematic bias in favour of domestic producers (for example, documentation needed, timing, volume of allocations). Such differences could be questioned under Art. III:4 GATT.

(3) In practice, the Most-Favoured-Nation Clause (MFN) of Art. I GATT might constitute a bigger challenge to the revision than National Treatment. Why deny a tax exemption for ethanol from sugarcane from country A based on some environmental and social clause, while country B profits from an exemption for the same product? We have very little WTO jurisprudence on the meaning of "like" products with regard to MFN. In particular, social criteria might not be accepted in this respect.

(4) A more fundamental question arises whether these tax exemption schemes should be evaluated under Art. I and III GATT (non-discrimination) or whether they could fall under the heading "subsidy". As part of the mineral oil tax law, understood as fiscal revenue law, these exemptions constitute forgone government revenue which is otherwise due (Art. 1.1 (a)(1) (ii) SCM). The question remains whether such subsidies are "specific" in the meaning of Art. 2.1 SCM. This might apply if the tax exemption is used, in practice, primarily by domestic producers of biofuel or biomass. If the programme would be deemed to constitute a subsidy contingent upon the use of domestic over imported goods, it would fall under the explicit prohibition of Art. 3.1(b) SCM. An important counter-argument would be at hand if the tax exemption were widely used for biofuels from foreign sources.

To summarise: We see no obvious reasons why the Swiss tax exemption scheme should violate WTO Agreements. But there are risks of grey area measures which could be challenged under WTO law and whose legitimacy cannot be clearly evaluated due to the lack of relevant WTO jurisprudence.

6 Conclusions and Policy Recommendations

We have discussed market trends and provided a short overview over national biofuel policies in the U.S. and the EU. With today's technology, biofuels are produced mainly from feedstock which has dual use as food and energy crop. Substitution effects are to be expected with implications for food prices and land use. Biofuel policies thus have a strong impact on agricultural markets. Empirical estimates of welfare benefits and costs of the U.S. ethanol policy are mostly negative due to distortions in agricultural markets and high protectionist barriers for low cost ethanol imports from Brazil. The focus in Europe is different; here, the demands for sustainability standards in tax incentive systems and market access programmes dominate. This calls for close scrutiny under existing WTO regulations. We close with some general conclusions and policy recommendations:

(1) The current push to expand the use of biofuels and to formulate very ambitious policy mandates for biofuels is creating strong tensions that will disrupt markets without generating significant environmental benefits[33]. If governments want to reach their stated objectives, they have to increase government support with strong upward pressure on food prices, high burdens on tax payers, and risks to the environment. Setting mandatory targets is risky when the potential supply of biofuel feedstock that can be produced sustainably is unknown and the commercialisation of second generation technologies is uncertain. We agree with DOORNBUSCH and STEENBLIK (2007) who state that "governments should cease creating new mandates for biofuels and investigate ways to phase them out". The costs to society exceed the benefits.

(2) The protectionist bias of most national biofuel policies has very high efficiency costs. Tariffs on ethanol are typically high (as a legacy of agricultural policies), and deprive cost efficient producers of market opportunities and importing countries of low cost sources of biofuels. Biofuel promotion in high cost countries is an inefficient way of farm support and rural development. The longer such policies remain in place, the higher is the risk of encouraging inefficient investments and the harder it will be to adjust if import barriers are removed. We have to be very careful that industrialised countries are not running into a new agricultural policy trap, this time under the objective to support environmentally friendly fuels.

(3) Points (1) and (2) combined speak for a much stronger role of markets for guiding biofuel development. With prospects of high oil prices, biofuels would develop more slowly but on a more sustainable path with open world markets. The often cited environmental and social risks of biofuel production are the result rather of market interventions than of market development. To cite one example: the strong increase in U.S. food export prices is the direct result of high subsidies to the use of crops for biofuel production.

(4) WTO disciplines are often cited as unwarranted restrictions to the inclusion of sustainability standards into preferential tax and market access regimes. A closer look supports a more positive picture. Although it has not yet been tested before WTO dispute settlement organs, there are strong arguments that a carefully drafted life-cycle provision for GHG emissions would be compatible with relevant WTO provisions. WTO disciplines ask

33 A similar view is expressed by DOORNBUSCH and STEENBLIK (2007).

for transparent, non-discriminatory standards which are based on international negotiations and whose impact is not as dissimilar as to distort competitive conditions between domestic and foreign producers. Such solutions might be more difficult to reach, but they are to be preferred to an unilateral imposition of national standards to other sovereign countries. It is also important that not each country develops its own idiosyncratic list of a complex set of environmental and social criteria, because such a situation would segment international markets for biofuels and prevent comparative advantages to be exploited, at the cost of both the potential exporting and importing country. As is the case with other areas of regulation, the discipline of WTO law is a good guide for policies which strike a reasonable balance between market efficiency and social objectives.

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