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An Examination of U.S. and EU Government Support to Biofuels: Early Lessons

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EXECUTIVE SUMMARY

U.S. and EU policies that shelter domestic agriculture risk limiting efforts to expedite cost-effective and sustainable uses of biofuels.

Although energy demand is increasing most rapidly in emerging economies, the United States and the European Union remain by far the largest energy consumers. The transport sectors in these economies rely on oil, but this comes with the price of high greenhouse gas emissions. Biofuels, produced from agricultural feedstocks, have come to the forefront of the energy agenda on both sides of the Atlantic as a means of decreasing reliance on oil. However, because biofuels are more expensive than fossil fuels, their utilization in the U.S. and EU depends upon government incentives. While these policies should promote biofuels that have an economic and environmental comparative advantage, the political reality is that domestic agricultural interests want policies that support the use of domestic feedstocks, regardless of energy efficiency or environmental sustainability. The objective of promoting domestic production, therefore, may undermine efforts to rapidly develop the most efficient, sustainable energy resources.

The absence of internationally agreed and scientifically valid biofuels standards will further increase the disproportionate focus on domestic production. Moreover, a lack of clarity about whether and, if so, how international trade obligations apply to the biofuels sector could strengthen this tendency. An overemphasis on domestic production by the United States and the EU risks trumping their policy objectives to improve energy efficiency, increase energy security, and reduce environmental degradation. Additionally, given the size of their economies, the ramifications of insular policies could have significant ripple effects worldwide, particularly for food and feed prices and for biofuel and agricultural opportunities in developing countries.

To ensure that biofuels are a source of efficient, sustainable energy, the United States and the EU should adhere to the following recommendations.

Governments must clarify their intent for supporting the biofuels industry:

- It is unrealistic to view biofuels alone as a panacea for achieving energy security, reducing GHG emissions, and establishing new markets for politically powerful agricultural sectors
- Energy security should not be mistaken for energy self-sufficiency.

This intent should be mirrored in the setting of EU and U.S. mandates, tax incentives, and tariffs:

- In the absence of viable second-generation biofuels, incentives, tariffs, and standards that are structured primarily to promote domestic production of certain biofuels will retard the procurement and development of other more energy — and cost-efficient — biofuels.
- Widening the access of imports to U.S. and EU domestic markets would help reduce upward pressure on commodity prices and lower the high costs of biofuels production, decreasing the risk of a backlash against government subsidies.
- Clarifying how WTO rules apply to the biofuels sector can pave the way for less distorted government support policies.

International standards are necessary to ensure that biofuels play a productive role in the push for renewable energy sources:

- Global sustainability standards can point the way towards optimal biofuels and feedstocks. The reduction of greenhouse gases should be the top priority.

- Without an international consensus on what constitutes sustainable biofuels production, environmental concerns can conveniently be used to cloak protectionist interests.

- Without widespread agreement on feedstock-neutral quality specifications, divergent technical standards can also be used for protectionist purposes.

The United States and the EU should consider the impact of their biofuels support policies on developing countries:

- Increased prices and new market opportunities will be welcome by developing countries with good production and export capacity. Rising food prices, however, hit net food importing developing countries especially hard.

- Considering the comparative advantage of many developing countries in agriculture, increased U.S. and EU openness to imports could provide economic growth opportunities for those countries with large production capacities.

- Other developing countries should be encouraged to explore the potential for domestic and small-scale biofuels production, which promises to be effective in the ongoing struggle for greater access to more sustainable energy sources and in the fight against poverty. As these countries do not have comparable means to subsidize their biofuels industry, the prospect of trade will facilitate investment.

- For international sustainability criteria to be effective, they must truly be global and incorporate the interests and concerns of developing countries. Given the possibility that these standards may limit economic growth in developing countries, care must be taken to help developing countries comply.

INTRODUCTION

Although energy demand is increasing most rapidly in emerging economies, the United States and the European Union remain by far the largest energy consumers. Both are concerned about the environment, desire greater energy security, and are thus eager to reduce their dependence on fossil fuels. Their efforts have focused in particular on the transport sector.

In the United States, transportation accounts for more than two-thirds of the country's oil consumption, and transportation vehicles emit 27 percent of the nation's total greenhouse gas emissions (a further nine percent of U.S. emissions are emitted from vehicle manufacturing and motor fuel production).[1] Similar patterns prevail within the 25-member EU region (EU25), with transportation consuming 37 percent of total oil used.[2] Between 1990 and 2004, greenhouse gas emissions from transport increased by 32.2 percent, or two percent per year on average. The share of transport in total EU25 GHG emissions rose from 17 percent in 1990 to 24 percent in 2004.[3] Since 1990, U.S. and EU transportation sector emissions have grown more in absolute terms than any other sector.

The transport sector's reliance on oil has brought biofuels to the forefront of the energy agenda on both sides of the Atlantic since, unlike other alternative energy resources, biofuels are already being used as additives to and substitutes for fossil fuels.

The costs, energy efficiencies, and net energy balances of biofuels vary widely, depending on the type of feedstock and production process used. Since the utilization of biofuels by the transport sector in the United States and the EU relies on government incentives, these policies should promote those biofuels that have an economic and environmental comparative advantage. The political reality, however, is that domestic interests, largely agricultural ones, expect to be the primary beneficiaries of generous incentives to achieve ambitious biofuel production targets. Policymakers are not shy about this. They promote biofuels not only for their energy and environmental benefits, but also for their role in strengthening the market for domestically produced agricultural feedstocks. This paper's examination of U.S. and EU incentives and tariffs demonstrates a high level of protectionism on both sides. Ultimately, the objective of promoting domestic production may undermine efforts to rapidly develop the most efficient, sustainable energy resources.

The objective of promoting domestic production may undermine efforts to develop the most efficient, sustainable energy resources.

[1] U.S. Department of Transportation, Bureau of Transportation Statistics. *Transportation Statistics Annual Report.* Chapter 2. 2004. Available at: http://www.bts.gov/publications/transportation_statistics_annual_report/2004/html/chapter_02/greenhouse_gas_emissions.html. Last viewed October 1, 2007.

[2] European Commission, Directorate-General for Energy and Transport. *Energy & Transport in Figures 2006. Part 2: Energy.* Statistics based on EU-25. Available at: http://ec.europa.eu/dgs/energy_transport/figures/pocketbook/doc/2006/2006_energy_en.pdf. Last viewed September 28, 2007.

[3] European Federation for Transport and the Environment. "Greenhouse Gas Emissions from Transport in the EU25. An Analysis of 2004 Data submitted to the UNFCCC." Available at: http://www.transportenvironment.org/docs/Publications/2006/2006-07_ghg_emissions_transport_eea_analysis_2004.pdf. Last viewed September 25, 2007.

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The lack of internationally agreed, scientifically valid, and workable standards for biofuels will further increase the disproportionate focus on domestic production. Moreover, a lack of clarity over whether and, if so, how international trade obligations apply to the biofuels sector, could strengthen this tendency.

An overemphasis on domestic production by the United States and the EU not only risks trumping their energy and environmental objectives, but given the size of their economies, the ramifications could have significant ripple effects worldwide, particularly on developing countries' efforts to fight poverty. Before examining these points, this paper explores U.S. and EU interest in biofuels and their policies for promoting biofuels.

I. THE APPEAL OF BIOFUELS

In 2004, the United States and the EU consumed 36.8 percent of the world's energy,[4] including more than 40 percent of global oil supplies. The energy consumption of the United States and the EU far exceeds their domestic energy resources. The U.S. transportation sector used 4.8-billion barrels of oil in 2004; it will need 6.8 billion by 2030.[5] Likewise, the EU's transportation sector consumed 2.4-billion barrels of oil equivalent in 2005, a number projected to hit 2.9 billion by 2020.[6]

This dependence on oil translates into large quantities of greenhouse gas[7] (GHG) emissions building in the earth's atmosphere. In the United States, transportation accounts for 32.9 percent of carbon dioxide (CO_2) emissions from fossil fuel combustion.[8] In Europe, road transport is responsible for 800-million metric tons of GHG emissions.[9] The projected increases in fossil fuel use over the next decade or two will only exacerbate the environmental damage caused by the transportation sector. The specter of climate change is generating interest worldwide in biofuels, since their combustion emits less GHG than fossil fuels.

Thus, similar concerns are driving the rapid development and utilization of biofuels on both sides of the Atlantic: energy security and environmental sustainability. For the United States, energy security is a priority. The country imports more than 60 percent of its oil, a commodity that rose from roughly $20 a barrel in 2002 to more than $60 in 2006. Reliance upon foreign providers for a resource so critical to the economy is increasingly worrisome to policymakers, especially given the omnipresent threat of terrorism. Political instability in many of the world's oil-exporting countries heightens this concern. Advocates see U.S. biofuels production as one solution in achieving energy independence. Climate change is the key motivator behind the EU's push to deploy biofuels for its transportation sector, and thereby help meet its emissions-reduction goals under the Kyoto Protocol.[10]

Advocates in the United States see biofuels as a means toward greater energy independence, while climate change is a key motivator for the EU.

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[4] European Commission, Directorate-General for Energy and Transport. *Energy & Transport in Figures 2006. Part 2: Energy.* Statistics based on EU-25. Available at: http://ec.europa.eu/dgs/energy_transport/figures/pocketbook/doc/2006/2006_energy_en.pdf. Last viewed August 7, 2007.

[5] United States Government Accountability Office. *Biofuels: DOE Lacks a Strategic Approach to Coordinate Increasing Production with Infrastructure Development and Vehicle Needs.* GAO-07-713. June 2007.

[6] Commission of the European Communities. *Communication from the Commission: Action Plan for Energy Efficiency: Realising the Potential.* Brussels, October 19, 2006. p. 7. Available at: http://ec.europa.eu/energy/action_plan_energy_efficiency/doc/com_2006_0545_en.pdf. Last viewed August 7, 2007.

[7] Greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. By trapping heat close to the earth's surface, these atmospheric gases contribute to higher temperatures and climate change.

[8] Davis, Stacy C. and Susan W. Diegel. *Transportation Energy Data Book.* Edition 26. Report ORNL-6978. U.S. Department of Energy, Oak Ridge National Laboratory. 2007. Available at: http://cta.ornl.gov/data/index.shtml. Last viewed September 4, 2007.

[9] European Environment Agency. *Transport and environment: on the way to a new common transport policy.* Copenhagen, 2007. Available at: http://reports.eea.europa.eu/eea_report_2007_1/en/eea_report_1_2007.pdf. Last viewed September 4, 2007. Data cover all 32 EEA countries.

[10] The goal of the Kyoto Protocol is to reduce worldwide greenhouse gas emissions to 5.2 percent below 1990 levels between 2008 and 2012. Compared to the emissions levels that would occur by 2010 without the Kyoto Protocol, however, this target actually represents a 29 percent cut.

The Kyoto Protocol sets specific emissions reduction targets for each industrialized nation, but excludes developing countries. To meet their targets, most ratifying nations would have to combine such strategies as: a) placing restrictions on the biggest polluters; b) managing transportation to slow or reduce emissions; and c) making better use of renewable energy sources.

The United States's gasoline-based transportation economy relies on ethanol, which is primarily made from its own corn production. In Europe, biodiesel is dominant because more than half of the vehicles in Europe operate on diesel. Rapeseed is the most common biodiesel feedstock grown in Europe. While corn-based ethanol and rapeseed-based biodiesel do emit less greenhouse gasses than fossil fuels, they are neither the most energy efficient nor the best sustainable option given production costs and net energy yields (see Table 1 and Figures 1 and 2).

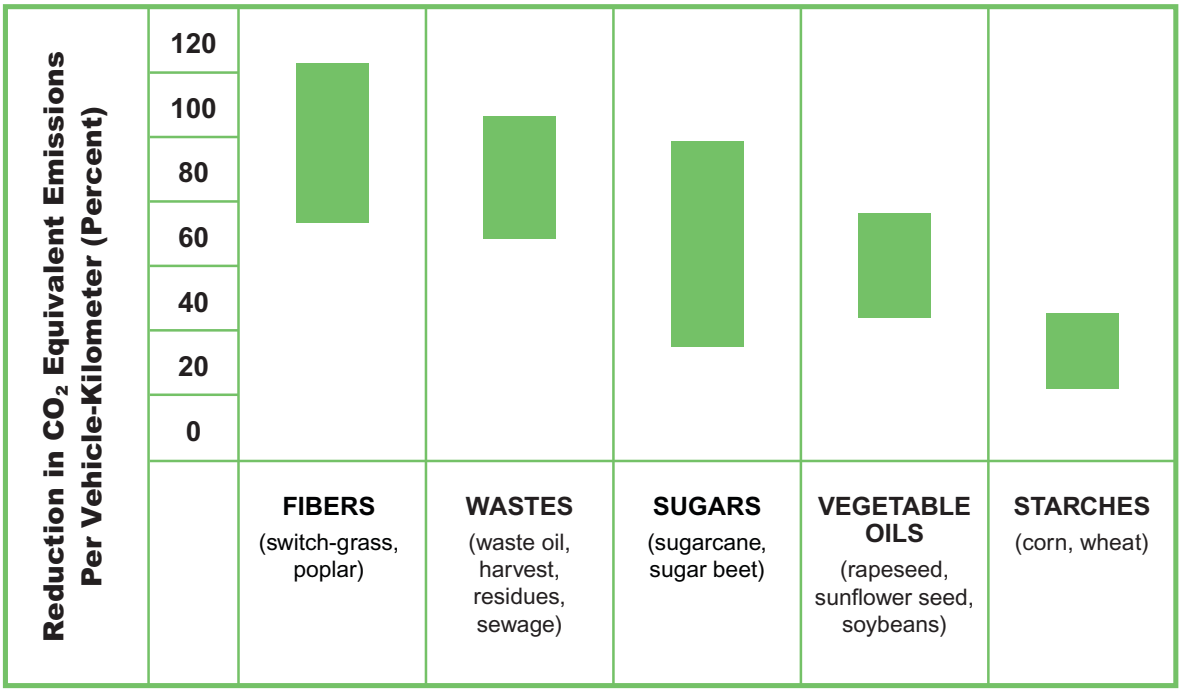
Table 1: Fossil Energy Balances of Selected Fuel Types

Fuel (Feedstock)	Fossil Energy Balance
Cellulosic ethanol	2-36
Biodiesel (palm oil)	~9
Ethanol (sugarcane)	~8
Biodiesel (waste vegetable oil)	5-6
Biodiesel (soybeans)	~3
Biodiesel (rapeseed, EU)	~2.5
Ethanol (wheat, sugar beets)	~2
Ethanol (corn)	~1.5
Diesel (crude oil)	.0.8-0.9
Gasoline (crude oil)	0.8
Gasoline (tar sands)	~0.75

NOTE: Figures represent the amount of energy contained in the listed fuel per unit of fossil fuel input. The ratios for cellulosic biofuels are theoretical.

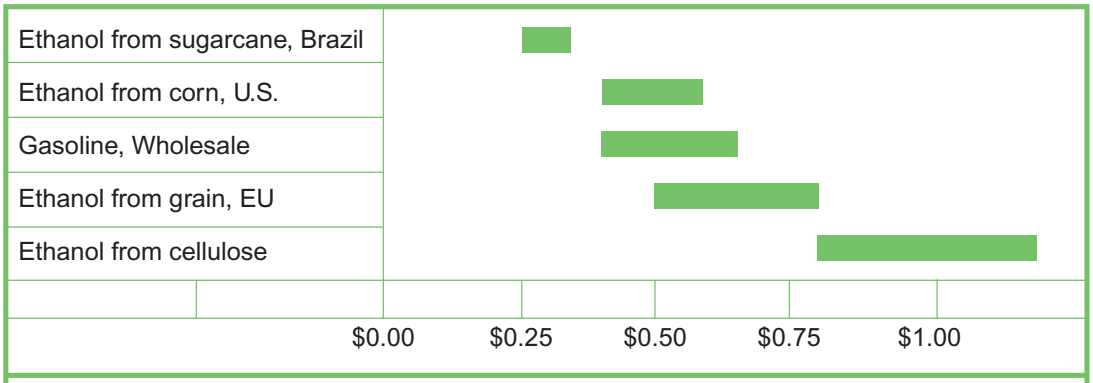
SOURCE: Worldwatch Institute, *Biofuels for Transport: Global Potential and Implications for Sustainable Agriculture and Energy in the 21st Century,* Summary. Washington, DC. June 2006.

Figure 1: Potential Reductions in Greenhouse Gas Emissions by Feedstock Type



SOURCE: IEA data in Worldwatch Institute, *Biofuels for Transport: Global Potential and Implications for Sustainable Agriculture and Energy in the 21st Century,* Summary. Washington, DC. June 2006.

Figure 2: Cost Ranges for Ethanol and Gasoline Production, 2006



SOURCE: IEA, Reuters, DOE in Worldwatch Institute, *Biofuels for Transport: Global Potential and Implications for Sustainable Agriculture and Energy in the 21st Century,* Summary. Washington, DC. June 2006.

Corn and rapeseed oil were chosen as the primary feedstocks because of their availability through domestic production. The growth in biofuel demand presents opportunities for agricultural producers on both sides of the Atlantic, particularly given the changes and uncertainties in agricultural support policies and international agricultural trade negotiations. In the EU, the emergence of a potentially lucrative market for biofuels is attractive, in light of the Doha Round commitment to phase out agricultural export subsidies and the increasing use

of "de-coupled domestic support," namely income support to producers which is not predicated on production. In the United States, producers of historically subsidized commodities are concerned about the pressure being exerted on U.S. negotiators to reduce trade-distorting agricultural subsidies during the Doha Round talks. U.S. commodity producers are skeptical that they will gain significant new market access in emerging markets if a trade accord emerges from the Doha Round. The 2007 farm bill debate in the United States has also made commodity producers more aware that other agricultural and non-agricultural domestic constituencies are questioning the fairness of U.S. commodity-support programs. Against this background, and to the delight of corn and rapeseed growers, the increased demand for biofuels has already led to sharp increases in prices and production for corn and rapeseed (see Tables 2 and 3).

Table 2: U.S. Corn Production, Prices, 2002-2007

Year	**Planted All Purposes** (thousand acres)	**Harvest** (thousand acres)	**Yield** (bushel)	**Production** (billion bushels)	**Price per Unit** (dollars/bushel)	**Value of Production** (billion dollars)
2002	78,894	69,330	129.3	8.97	$2.32	20.88
2003	78,603	70,944	142.2	10.09	$2.42	24.48
2004	80,929	73,631	160.4	11.81	$2.06	24.38
2005	81,779	75,117	148	11.11	$2.00	22.20
2006	78,327	70,648	149.1	10.53	$3.20	33.84
2007	92,888	85,418	152.8	13.05	NA	NA

SOURCE: USDA National Agricultural Statistics Service. Field Corn.
Available at: http://www.nass.usda.gov/Statistics_by_Subject/index.asp

Table 3: EU-27 Rapeseed Production, Prices, 2002-2007

Marketing Year	**Area Harvested** (Thousand hectares)	**Production** (Thousand metric tons)	**Oilseed Price** (dollars per metric ton)*
2002/2003	4,270	11,752	$285
2003/2004	4,198	11,185	$317
2004/2005	4,572	15,432	$262
2005/2006	4,846	15,523	$292
2006/2007	5,355	15,962	$358
2007/2008	6,244	17,200	NA

*Hamburg CIF; Europe "00" Oil; Oil World.

SOURCE: USDA Foreign Agricultural Service. *Oilseeds: World Markets and Trade.* August 2007.
Available at: http://www.fas.usda.gov/oilseeds/circular/2007/August/oilseedsfinal0807.pdf.

II. AMBITIOUS BIOFUEL PRODUCTION MANDATES

Reliance on domestic production risks trumping energy efficiency and sustainability objectives, but is also problematic given the land constraints in the United States and the EU. Even with increased production of biofuel feedstocks, the United States and the EU do not have the necessary resources to meet ambitious biofuel mandates through domestically produced biofuels. Less than two percent of U.S. transportation fuel and one percent of the EU's comes from biomass, despite the fact that almost one-fifth of U.S. corn and two-thirds of EU rapeseed are processed, respectively, into ethanol and biodiesel.[11]

The EU and the United States have each passed legislation that mandates the incorporation of biofuels into the transportation sector. The EU's effort began in 2003 with a Biofuels Directive, which called for two percent of the fuel used in the transportation sector to be biofuels by 2005 and 5.75 percent by 2010.

Since the directive established indicative, not mandatory, targets, the use of biofuels only reached one percent of transportation fuel in the EU by 2005. Germany achieved the highest level among the member-states with a 3.75 percent level followed by Sweden with 2.23 percent. The remaining member-states were below one percent. One factor explaining the relatively higher rate of adoption in Germany and Sweden is that both countries chose to combine domestic production with imports.[12]

The disappointing rate of adoption led the EU to review its policy, as called for in the 2003 Biofuels Directive. In January 2007, it issued a Biofuels Progress Report, which concluded that the 2010 target of 5.75 percent was unlikely to be met. Acknowledging that there was no scientific evidence to explain the low adoption rate for biofuels, the report proposed a mandatory target: biofuels would supply 10 percent of the transportation sector's fuel needs by 2020. This goal was endorsed at the March 2007 European Council meeting, but it was made conditional on the commercial availability of second-generation biofuels[13] and on sustainable biofuels production. The target will be formally proposed in a general Directive on Renewable Energy, which the European Commission will introduce at the end of 2007 for debate within the Council and European Parliament.

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[11] Energy Information Administration. *Annual Energy Review 2006.* "Energy Consumption by Sector:Transportation Sector Energy Consumption, 1949-2006." June 27, 2007. Available at: http://www.eia.doe.gov/emeu/aer/consump.html. Last viewed October 1, 2007.

USDA Foreign Agricultural Service. "EU-27 Biofuels: Commission Publishes Impact Assessment of the 10 Percent Biofuel Obligation." Global Agriculture Information Network, Report No. E47066. August 8, 2007. Available at: http://www.fas.usda.gov/gainfiles/200708/146291987.pdf. Last viewed October 1, 2007.

USDA Economic Research Service. "Ethanol Reshapes the Corn Market." *Amber Waves,* Vol. 4, Issue 2, updated May 2007. Available at: http://www.ers.usda.gov/AmberWaves/May07SpecialIssue/Features/Ethanol.htm. Last viewed October 1, 2007.

USDA Foreign Agricultural Service. "EU-27 Oilseeds and Products, Annual." Global Agriculture Information Network, Report No. E47047. May 31, 2007. Available at: http://www.fas.usda.gov/gainfiles/200706/146291409.pdf. Last viewed October 1, 2007.

[12] Commission of the European Communiites, Communication from the Commission to the Council and the European Parliament. Biofuels Progress Report. COM(2006) 845 final. p. 6. January 1, 2007. Available at: http://eur-lex.europa.eu/LexUriServ/site/en/com/2006/com2006_0845en01.pdf. Last viewed October 1, 2007.

[13] The term "second-generation biofuel" generally refers to technologies that are sufficiently advanced from those now employed or experimental in nature.

In the United States, the government required the use of ethanol as a gasoline oxygenate as early as 1990 in areas with poor air quality. However, it was not until the Energy Policy Act of 2005 that the U.S. Congress instituted a federal mandate for biofuel use in the transportation sector. The Renewable Fuels Standard (RFS) called for an escalation in the amount of renewable fuel sold in the United States from 2006 through 2012.[14]

Table 4: U.S. Renewable Fuels Standard

Calendar Year	Target (billions of gallons)
2006	4.0
2007	4.7
2008	5.4
2009	6.1
2010	6.8
2011	7.4
2012	7.5

High oil prices and the demand shock caused by the elimination of one oxygenate (methyl tert-butyl ether, MTBE),[15] along with other incentive policies, created such a favorable environment for biofuels, that the United States has already exceeded the RFS mandate. In 2006, the United States produced 4.86-billion gallons of ethanol, a 24.3-percent increase over 2005.[16] USDA projections for 2006 through 2016 predict that, from the 2009/2010 crop year forward, more than 30 percent of the corn harvested in the United States will be used for ethanol. By 2016, more than 12-billion gallons will be produced.[17]

In his 2007 State of the Union address, President George W. Bush called on the U.S. Congress to increase the RFS to 35-billion gallons by 2017. Legislators responded eagerly, introducing numerous proposals to raise the mandate. Congress is considering a bill that will increase the RFS from 5.4-billion gallons to 8.5-billion

[14] To address the differences in energy content among fuel types and to encourage the production of biodiesel and cellulosic energy, Congress established an equivalence scale: one gallon ethanol = one credit; one gallon biodiesel = 1.5 credits; one gallon cellulosic ethanol = 2.5 credits.

[15] Methyl tert-butyl ether or MTBE has largely been discontinued as an oxygenate because of its potential to contaminate ground water. When Congress did not grant liability protection for MTBE producers and blenders in the 2005 Energy Bill, these parties rapidly switched to using ethanol as an oxygenate.

[16] Energy Information Administration. "Ethanol and Biodiesel Overview, 1981-2006." Available at: http://www.eia.doe.gov/emeu/aer/txt/ptb1003.html. Last viewed August 7, 2007.

[17] USDA Economic Research Service. "US Biofuel Overview." Available at: http://www.ers.usda.gov/Briefing/Baseline/crops.htm#box1. Last viewed August 7, 2007. For projections, see "USDA Long-Term Agricultural Projection Tables," Table08.wk1 US corn, at: http://usda.mannlib.cornell.edu/MannUsda/viewStaticPage.do?url=http://usda.mannlib.cornell.edu/usda/ers/94005/./2007/. Last viewed August 7, 2007.

Total motor vehicle fuel use in 2016 is projected to be 153 billion gallons (http://www.eia.doe.gov/oiaf/aeo/excel/aeotab_2.xls).

gallons in 2008, with an ultimate goal of 36-billion gallons by 2022. In addition to the federal mandate, some states have their own blending requirements. For example, Minnesota and Montana require that all gasoline sold within their borders uses a 10-percent ethanol blend. Minnesota also mandates a two-percent biodiesel blend with petroleum diesel. Louisiana has a similar two-percent requirement for both ethanol and biodiesel.

Unless the United States and the EU were to heavily sacrifice food production in favor of biofuels, they cannot meet their proposed mandates through domestic production alone — even if the amount of land used, crop yields, and production efficiencies were sharply increased.

These proposed mandate levels in the United States and the EU exceed the amount of biofuels that can be supplied domestically. Using production projections from the U.S. Department of Agriculture and the EU's Directorate General for Agriculture, the International Energy Agency predicts that at least 20 percent of the cropland in both locations would be necessary to supply just five percent of domestic fuel needs by 2010 (Table 5). To meet the EU's biofuels target of 10 percent by 2020, 38 percent of EU cropland would have to be devoted to biofuels. According to the IEA, displacing 10 percent of fossil fuel use for transport in the United State would require more than two-fifths of U.S. cropland for a yield of only 30-billion gallons of biofuels.[18] And in fact, after accounting for projected corn yield improvements, the cultivation of previously idle or pasture land, and the transfer of land from other crops to corn, the USDA's own estimates calculate that the maximum production capacity for U.S. corn ethanol would be merely 15-billion gallons. Unless the United States and the EU were to sacrifice food production in favor of biofuels, they cannot meet their proposed mandates through domestic production alone — even if the amount of land used, crop yields, and production efficiencies were sharply increased.

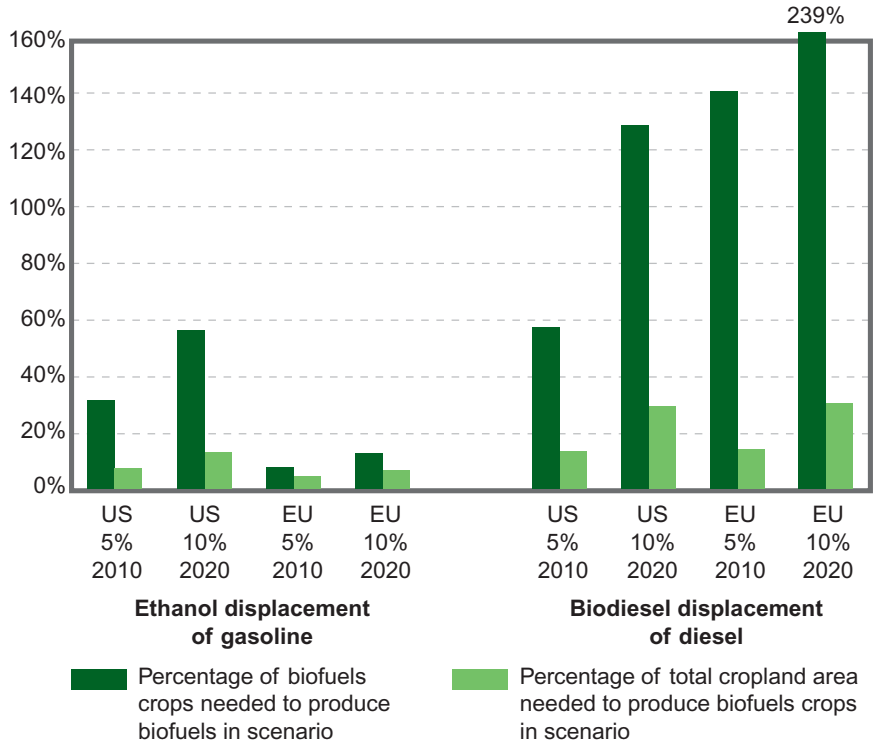
Table 5: U.S. and EU Biofuels Production Scenarios for 2010 and 2020

	2010				2020			
	US		EU		US		EU	
	Ethanol	Biodiesel	Ethanol	Biodiesel	Ethanol	Biodiesel	Ethanol	Biodiesel
Displacement of conventional fuel, per cent (on energy basis)	5.0%	5.0%	5.0%	5.0%	10.0%	10.0%	10.0%	10.0%
Biofuels production under scenario								
Total gasoline/diesel use (billion litres)	535.3	189.6	157.8	178.7	596.0	239.5	164.4	206.3
Required biofuel share of gasoline/diesel pool (volume basis)	7.2%	5.7%	7.2%	5.7%	14.1%	11.3%	14.1%	11.3%
Gasoline/diesel displacement under scenario (billion litres)	28.6	9.5	7.9	8.9	59.6	23.9	16.4	20.6
Required biofuel production under scenario (billion litres)	38.6	10.8	11.4	10.2	84.1	27.1	23.2	23.3
Cropland requirements and availability								
Average biofuels production yields (litres per hectare)	3800	600	4800	1400	4700	700	5900	1600
Cropland area needed for production of biofuels (million hectares)	10	18	2	7	18	40	4	15
Expected cropland area of relevant crops (million hectares)	32	31	30	5	32	31	29	6
Percentage of biofuels crop area needed to produce biofuels	31%	58%	8%	141%	56%	129%	13%	239%
Total cropland area (million hectares)	133	133	49	49	133	133	49	49
Percentage of total cropland area needed to produce biofuels crops for each fuel	81%	13%	5%	15%	14%	30%	8%	30%
Percentage of total cropland area needed to produce crops for both fuels	21%		20%		43%		38%	

SOURCE: IEA. Projections of transport fuel demand from IEA/WEO (2002; U.S. crop production on projections from USDA (2002); projections of conversion efficiency are based on 1995-2000 trend from NREL. EU land data and crop production projections from EC-DG/Agri (2001-2002).

[18] 1 liter = .2641 U.S. gallons.

Figure 3: Estimated Required Crops and Cropland Needed to Produce Biofuels under 2010/2020 Scenarios[19]



[19] International Energy Agency. *Biofuels for Transport: An International Perspective.* 2004. Available at: http://www.iea.org/textbase/nppdf/free/2004/biofuels2004.pdf. Last viewed: September 28, 2007.

Ambitious mandates are predicated on the inclusion of second-generation biofuels. Should cellulosic ethanol[20] become commercially viable, the amount of acres and biomass available for biofuels production would significantly increase, since these feedstocks (for example, switchgrass and willow trees) could be perennial, planted on marginal land, and bred for biomass volume. In a joint study, the USDA and the U.S. Department of Energy estimate that the use of traditional crops, crop residue, perennial energy crops, animal manure, and lumber industry residue could replace 30 percent of petroleum use in the United States. This would require significant yield increases along with the dedication of 55-million acres of cropland, idle cropland, and cropland pasture for perennial energy crops.[21] Production costs may also be reduced via the Fischer-Tropsch process, which would increase the biodiesel yield from oilseed crops.[22]

In the absence of second-generation biofuels, imports are needed if the ambitious biofuels mandates being contemplated in the U.S. and EU are to be realized. Yet, an examination of U.S. and EU tax incentives and tariffs demonstrates significant barriers to imports on both sides of the Atlantic. Ambitious biofuel mandates, combined with trade barriers, risk over-emphasizing domestic production of first-generation biofuels in the United States and the EU.

It is beyond the scope of this paper to evaluate the potential of second-generation biofuels, but an in-depth examination of this potential is advised, given the expectations of their future contribution. For now, second-generation technologies remain cost-prohibitive, with the most credible projections pointing to commercial viability within five to fifteen years.[23] EU policymakers have noted the need to import biofuels and feedstocks if their ambitious target is to be met. For the United States, the greater availability of land and the stronger faith in biotechnology to increase yields of first-generation feedstocks has led some policymakers to be optimistic that the larger proportion of the U.S. mandate could be met domestically. Even still, imports would be needed, with the amount dependent on costs, net energy yields, and other considerations.

In the absence of second-generation biofuels, imports are clearly needed if the ambitious biofuels mandates being contemplated in the U.S. and EU are to be realized. Yet, an examination of U.S. and EU tax incentives and tariffs, undertaken in the next section, demonstrates significant barriers to imports on both sides of the Atlantic. Ambitious biofuel mandates, combined with trade barriers, risk over-emphasizing domestic production of first-generation biofuels in the United States and the EU.

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[0] Cellulosic ethanol is produced from lignocellulose, a structural material that comprises much of the mass of plants. While chemically identical to first-generation ethanol, lignocellulosic raw material is available in a much greater range of biomass, but cellulosic ethanol requires a greater amount of processing than starch or sugar crops.

[21] According to the USDA and the Department of Energy, producing a significant amount of ethanol from biomass would require several adjustments in agriculture and natural resource management: "Providing this level of biomass will require increasing yields of corn, wheat, and other small grains by 50 percent; doubling residue-to-grain ratios for soybeans; developing much more efficient residue harvesting equipment; managing active cropland with no-till cultivation; growing perennial crops whose output is primarily dedicated for bioenergy purposes on 55 million acres of cropland, idle cropland, and cropland pasture; using animal manure in excess of what can be applied on-farm for soil improvement for bioenergy; and using a larger fraction of other secondary and tertiary residues for bioenergy." U.S. Department of Agriculture and U.S. Department of Energy. *Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The Technical Feasibility of a Billion-Ton Annual Supply.* April 2005. Available at: http://www1.eere.energy.gov/biomass/pdfs/final_billionton_vision_report2.pdf. Last viewed September 28, 2007.

[22] The Fischer-Tropsch process breaks down biomass into gas by using heat or chemicals rather than microbes.

[23] International Energy Agency. *Biofuels for Transport: An International Perspective.* 2004. Available at: http://www.iea.org/textbase/nppdf/free/2004/biofuels2004.pdf. Last viewed: September 28, 2007;

III. TAX INCENTIVES AND TARIFFS PROMOTE DOMESTIC PRODUCTION, DISCOURAGE IMPORTS

In addition to mandates, the EU and the United States have encouraged the use of biofuels through tax incentives. In the United States, this has been the case for nearly 30 years. Reacting to the oil price shocks of the 1970s, the federal government instituted a tax credit for ethanol production in 1978. As of 2007, this had evolved into the Volumetric Ethanol Excise Tax Credit, which provides a 51-cent per gallon tax credit for every gallon produced of ethanol-blended gasoline.

A federal tax credit for blending biodiesel with petroleum diesel was introduced in 2004 at $1.00 for each gallon of biodiesel produced from both virgin oils and fats, and 50 cents for biodiesel made from recovered oils and fats. Fuel blenders collect these incentives, which are authorized by Congress through 2010 and 2008, respectively.[24]

EU member-states have put varying levels of exemptions into place to promote the use of biofuels (Table 6). This has created a non-uniform biofuels market with differing levels of incentives. Not only have different member-states implemented different levels of tax reductions, but they also often vary in content.

Table 6: EU Member State Tax Incentives

Belgium	Tax benefits for certain quota for blending max. 3.75 percent.
France	Reduced energy tax for certain volume (quota), marketed in France, distributed via bidding system for companies on a yearly basis. Bidding is also open for non-French companies. In the current cycle companies from France, Italy and Germany hold quotas entitlements.
Germany	Energy tax reduction for B100. Until August 2006, tax was set at zero. Currently tax amounts to 9 cents per liter versus 47 cents for diesel. The tax reduction is phased out over the next years. By 2012, taxes for diesel and biodiesel will be at the same level.
Greece	Exemption for fuel tax for pre-fixed volume, by application, first come first served basis.
Poland	New tax exemptions, which were approved by parliament but not finally published yet, are slightly increasing current excise tax exemptions per liter of biocomponents added to biofuels: for diesel tax exemption to PLN 1.048 (Euro 0.28) from current PLN 1.0, and for ethanol excise tax exemptions to PLN 1.565 (Euro 0.41) from current PLN 1.5; for 100 percent biocomponent fuel excise tax will be reduced down to PLN 0.01 (Euro 0.003) from current PLN 0.20; The industry opinion is that tax exemptions are not sufficient to be attractive.
Hungary	Excise tax repayment system, started January 2007.
Poland	Excise tax set to zero, went into effect January 2007, not enough to be attractive.
UK	20 pence per liter fuel duty abatement since 2002, not enough to be attractive.

SOURCE: USDA Foreign Agricultural Service. *EU-27 Biofuels Annual 2007*. Global Agricultural Information Network Report, Number E47051. June 4. 2007.

[24] Section 1344 of the Energy Policy Act of 2005 extended the existing tax credit for biodiesel producers through 2008, and the Volumetric Ethanol Excise Tax Credit (VEETC) through 2010. U.S. Department of Energy, Energy Efficiency and Renewable Energy. *Federal Biomass Policy.* Available at: http://www1.eere.energy.gov/biomass/printable_versions/federal_biomass.html. Last viewed October 1, 2007.

Like mandates, tax incentives are not inherently trade-distorting. Germany's approach provides a good example. This country pioneered tax exemptions to promote biofuels. It first exempted pure biodiesel from the 47 cents per liter mineral oil tax. In 2004, this exemption was extended to all biofuels and portions of biofuels blended with oil. Germany also raised its tax for diesel fuel, making biodiesel even more attractive to consumers. The exemptions applied equally to domestic and imported biofuels. One could argue that these incentives were too successful. In 2007, the German government began eliminating tax exemptions for biodiesel and vegetable oils to address concerns about a possible tax revenue shortfall.

However, Germany's open policy was not replicated by all EU member-states. In France, tax exemptions are available for a limited variety of biofuels, which must be produced and sold in the French market. In the context of the EU, therefore, French biofuel producers have been able to benefit from Germany's tax incentives, but German producers (as well as others) have encountered hurdles when exporting to France. The wide differences in tax incentives within the EU arguably create barriers within the internal market and make it extremely difficult to monitor the levels of support being provided. A veteran watcher of EU agricultural policies has spoken of French biofuel subsidies as being in the "form of tax credits and licenses, which makes them much harder to track than the EU cash subsidies."[25]

The 51-cent per gallon tax credit for ethanol and the $1.00 per gallon tax credit for biodiesel in the United States are akin to Germany's policy. They do not discriminate between domestic and foreign biofuels, but a tariff on ethanol effectively ensures that the tax credit primarily benefits domestic biofuel producers.

Tax incentives may not be trade-distorting, but accompanying measures can make them discriminatory. Along with the tax credit, the United States imposes a tariff on imported ethanol designated for fuel use. It is above and beyond the most-favored-nation rate applied to imported ethanol (2.5 percent ad valorem for undenatured ethanol for non-beverage purposes, 1.9 percent for denatured ethanol).[26] The tariff is currently 54 cents per gallon, three cents higher than the tax credit. A similar barrier does not apply to biodiesel, but interest groups such as the American Soybean Association are pressing Congress to enact a tariff to offset the $1.00 per gallon tax credit.

In addition to canceling each other out, tax incentives and tariffs can be partnered in a way that favors domestically produced biofuels. In the EU, for example, tax incentives for ethanol apply only to undenatured ethanol. As the tariff on undenatured ethanol is considerably higher than on denatured ethanol (19.2 euros per hectoliter versus 10.2 euros per hectoliter), and as some member-states only allow undenatured ethanol to be blended into gasoline, such measures serve to discourage imports.

Government-supported mandates and incentives are commonly implemented in ways that support the use of domestic feedstock and biofuels.

Government-supported mandates and incentives may not be inherently trade-distorting, but they are commonly implemented in ways that make the use of domestic feedstock and biofuels preferable. While they may be popular with a small, powerful group of constituents, these policies are not in the long-term interests of the EU and the United States in addressing energy and environmental concerns, considering existing land limitations and the relatively lower net energy yields and GHG reductions provided by domestic feedstocks.

[25] Patrick Messerlin, Director of the Groupe d'Economie Mondiale de Sciences Po, at the German Marshall Fund of the United States, May 7, 2007.

[26] Unlike undenatured ethanol, denatured ethanol contains a small amount of a toxic substance, such as methanol or gasoline, which cannot be removed easily by chemical or physical means.

IV. GLOBAL STANDARDS ARE NEEDED BUT WILL BE DIFFICULT TO REACH

The realization that ambitious mandates require substantial imports has led to calls for global sustainability standards. Any such standards should also be applied to biofuels produced from U.S. and EU feedstocks. Internationally agreed, and scientifically valid, quality and sustainability standards for biofuels could usefully refocus the biofuels debate onto energy and environmental considerations. Reaching international consensus on what constitutes legitimate, technical objectives and criteria — as well as what makes a product environmentally sustainable — is extremely difficult. Even if such a consensus were to be forged, effective implementation would remain challenging. Without such a consensus, national standards risk being abused for protectionist purposes.

Technical biofuels standards specify — among other things — the percentage and characteristics of biofuels that can be blended into transportation fuels. Such technical requirements are important to ensure the quality of the fuel and to facilitate consumer acceptance of biofuels. The Technical Barriers to Trade Agreement refers to the important contribution that international standards and conformity assessment systems have on improving production efficiencies and facilitating international trade. In particular, the agreement stresses that international standardization can encourage the transfer of technology from developed to developing countries.[27] International technical standards can facilitate the development of the biofuels industry in developed and developing countries while promoting international trade opportunities.

In the absence of international standards, countries are adopting their own technical requirements, which may be difficult and costly for developing countries to comply with. Varying technical and sustainability biofuels standards could serve to cloak protectionist motivations.

Efforts are underway to arrive at common standards for biofuels, promoted in part by the automobile industry, which is keen to operate in a global market with harmonized or compatible regulations. An International Biofuels Forum (composed of the United States, Brazil, China, India, South Africa, and the European Commission) is examining the development of common biofuels standards and codes to facilitate the commoditization of biofuels.[28] The EU and the United States also agreed at their June 2006 summit to focus on biofuels standards as part of their strategic energy cooperation.[29] Additionally, cooperation on standards is an item in the March 2007 US-Brazil Memorandum of Understanding to advance cooperation on biofuels. The MOU states that, with such cooperation, "greater adoption of biofuels has the potential to spur renewable energy investment, facilitate technology transfer, stimulate rural development, and boost job creation in countries around the world." It is interesting to note that the MOU specifies: "this initiative does not include discussion of United States trade, tariffs, or quotas."[30]

The parties to these bilateral and multilateral discussions have yet to arrive at or announce any agreement on global standards. Regulation of U.S. fuel standards is primarily done at the state level, which illustrates how difficult international harmonization may prove to be. In the absence of international standards, countries are adopting technical requirements that may be costly and difficult to comply with, particularly for developing country producers. Moreover, the complexity of such standards can be welcomed by protectionist interests, who would like to mask their motivations behind technical requirements.

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[27] Preamble of the WTO Agreement on Technical Barriers to Trade. Available at: http://www.wto.org/english/tratop_e/tbt_e/tbt_e.htm. Last viewed October 1, 2007.

[28] United Nations. "Press Conference Launching International Biofuels Forum." March 2, 2007. Available at: http://www.un.org/News/briefings/docs/2007/070302_Biofuels.doc.htm. Last viewed August 7, 2007.

[29] European Union and the United States of America. *Vienna Summit Declaration.* June 21, 2006. Available at: http://ec.europa.eu/external_relations/us/sum06_06/docs/decl_final_210606.pdf. Last viewed August 7, 2007.

[30] United States Department of State. "Advancing Cooperation with Brazil on Biofuels." Washington, DC. March 9, 2007. Available at: http://www.state.gov/r/pa/prs/ps/2007/mar/81589.htm. Last viewed August 7, 2007.

Feedstock specifications illustrate how standards can operate as barriers. The EU biodiesel standard fixes the iodine level that is required for vegetable oils used in biodiesel production, which in turn determines which types of feedstocks may be used. A specification on the content of iodine is an indication of the content of unsaturated fatty acid, which provides information about biodiesel's melting point. Only rapeseed oil complies with current iodine standards; palm and soy oils do not. The technical justification for this is that biodiesel produced from low iodine level vegetable oils is considered more stable and more suitable for the European climate. However, it appears technically feasible to include larger quantities of vegetable oils with higher iodine levels. There is some discussion over permitting a wider range of vegetable oils for biodiesel production. Proponents for expanding the range of feedstock imports that could be used in biodiesel argue that the iodine levels should be changed. The Dutch government, for example, strongly advocates increasing EU imports of biofuels and feedstocks. They see foreign competition as key in exerting downward pressure on the biofuel prices, and, as such, point to existing fuel quality standards that limit the amount of blending and the types of plant oil that can be used as one of the main obstacles blocking biofuel use within the EU.[31] However, producers, who benefit from rapeseed being the only European biodiesel feedstock, would like to see the specification remain.

In the United States, the National Biodiesel Board (NBB) has closely scrutinized the U.S. tax authorities' guidance documents regarding the U.S.'s volumetric biodiesel credit. This guidance spells out the percentage of biodiesel and the technical standards for producers who would like to benefit from the volumetric tax credit. The NBB's interest in these matters is arguably not solely driven by technical interests, but also by a desire to limit the tax credit benefits to biofuels produced in the United States from U.S. feedstocks.[32]

Although biofuels have emerged as an attractive renewable energy source, questions are being raised about potentially detrimental environmental impacts. Energy and environmental experts have raised questions about the net GHG emissions of different types of biofuels (Figure 1). A crucial aspect of an international sustainability standard for biofuels will be an agreement on how CO_2 credit determination for biofuels should be harmonized. The magnitude of a product's "carbon footprint" depends not only on its carbon output, but also on the parameters of measurement that are established. For example, is the carbon footprint of ethanol measured only by its carbon emissions when burned, or does the carbon released during feedstock cultivation also apply? At what point during biofuels production does the measuring stop? This is an immensely complex area and arguably the one for which solid international consensus is not only the most crucial but also the most difficult to achieve.

Environmentalists are also questioning the potential impact that the massive production of biofuels would have on water availability, soil fertility, biodiversity, and air quality. Concerns have also been raised about food versus fuel conflicts and negative social impacts (i.e. treatment of smallholders and workers). This debate can help steer biofuels production in a manageable, sustainable manner. Sustainability standards — if internationally agreed — could establish some helpful rules for biofuels production and trade. Should international consensus prove unfeasible, varying types of standards could cloak protectionist motivations, leading to significant trade distortions. According to the World Bank, "arguably the greatest technical barrier in the coming years could be certification of biofuels for environmental sustainability."[33]

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[31] The Dutch government's review of the EU Biofuels Directive, July 10, 2006, question 2.2.

[32] National Biodiesel Board. "Issue Brief: Biodiesel Tax Credit Implementation." Available at: http://www.biodiesel.org/news/taxincentive/Biodiesel%20Tax%20Credit%20NBB%20Issue%20Breif.pdf. Last viewed August 7, 2007

[33] World Bank ESMAP Report "Considering Biofuel Trade Policies," 2007.

Several EU member-state governments and environmental groups have either endorsed or are developing sustainability standards for biofuels. A new EU-wide Directive on Renewable Energy will be proposed by year-end 2007. The proposed 10-percent target for biofuels as transportation fuel would not be implemented until there are assurances that production to meet that target will be sustainable. It will be difficult to reach an EU-wide consensus on what constitutes sustainable production, given the many initiatives underway at the member-state and provincial levels. In Belgium, for example, there are three different sets of certificate systems at the provincial level.[34] Stakeholders supporting sustainability standards have diverse interests — from rainforest protection to banning the use of genetically modified feedstocks for biofuels to the prevention of child labor. A compromise could result in implementation of overly detailed standards, leading to compliance difficulties or in standards so general that they risk becoming meaningless.

Sustainability standards risk becoming overly detailed and difficult to certify or so general as to become meaningless. A crucial aspect of an international sustainability standard for biofuels should be an agreement on how CO_2 credit determination for biofuels should be harmonized.

In light of these difficulties at the EU level, international consensus may be even more elusive. A multi-stakeholder process, called the Roundtable on Sustainable Biofuels, was officially launched in April 2007. It aims to develop by early 2008 principles and criteria related to biofuels' environmental and social impacts as well as overall GHG benefits. This global feedback process will focus on such areas as biodiversity, water resources, labor and land rights, and rural development.[35] Another attempt to arrive at international standards is underway in the G-8 Global Bioenergy Partnership Forum.[36]

International standards would be preferable to EU-wide standards, but they will be far more difficult to establish. While the EU's "fundamental benchmark must be an environmental one,"[37] as EU Trade Commissioner Peter Mandelson explained, the United States's primary interest in promoting biofuels is energy security. Moreover, the United States has strongly resisted discussing biofuel sustainability standards at the international level. This reluctance follows its general aversion to regulations detailing production-process methods, but it may also stem from sensitivities to how its own corn ethanol may fare under such scrutiny. Indeed, compared to sugarcane ethanol, the environmental benefits of corn ethanol stand up poorly (Figure 1 and Table 1). The amount of fossil energy that goes into producing corn (through fertilizers, pesticides, and machinery use), combined with the small quantity of extractable energy contained in a corn kernel, makes corn a less desirable biofuel feedstock.

[34] Van Dam, Jinke, Martin Junginger, Andre Faaij, Ingmar Juergens, Gustavo Best, and Uwe Fritsche. "Overview of recent developments in sustainable biomass certification," paper written for IEA Bioenergy Task Force, December 2006, p.6. Available at: http://www.bioenergytrade.org/downloads/ieatask40certificationpaperdraftforcomments22..pdf. Last viewed October 1, 2007.

[35] Luy, Florence. "EPFL Announces Global Alliance to Ensure Biofuels' Sustainability." École Polytechnique Fédérale de Lausanne. April 17, 2007. Available at: http://actualites.epfl.ch/presseinfo-com?id=438. Last viewed October 1, 2007.

[36] The Global Bioenergy Partnership, or GBEP, was launched during the Ministerial Segment of the 14th session of the Comission on Sustainable Development (CSD14) in New York on May 11, 2006. By bringing together the G8+5 (Brazil, China, India, Mexico, and South Africa), it facilitates a joint commitment to promote bioenergy for sustainable development.

[37] Mandelson, Peter. "The Biofuel Challenge" speech at Biofuel Conference Organized by the European Commission. Brussels, Belgium. July 5, 2007. Available at: http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/07/467&format=HTML&aged=0&language=EN&guiLanguage=en. Last viewed October 1, 2007.

A range of legitimate concerns has been raised, not only in the EU and the United States, but also by groups in Malaysia and Indonesia, about a potential vast expansion of palm oil plantations, rainforest clearance, and displacement of smallholders. Likewise, there are groups in Brazil concerned about sugarcane burning, poor working conditions on sugarcane plantations, and expanded sugarcane planting encroaching on other agricultural lands, expediting deforestation trends. Yet while exporting countries may have concerns about environmental and social sustainability issues, these may well compete with equally strong, economic interests. In the midst of this debate, the findings of the 1987 Brundtland Report on sustainable development are relevant.[38] In identifying poverty as one of the most important causes of environmental degradation, this report argued that greater economic growth and trade could help overcome the "pollution of poverty."

The perception — that developed countries are demanding inordinately stringent criteria from developing countries — may further complicate the international discussion on GHG emissions mitigation. Developing countries are likely to argue that overly stringent standards jeopardize their opportunities to industrialize, whereas no such constraints were placed on developed countries during their industrialization. Ultimately, any sustainability criteria should offer developing countries incentives to produce sustainably rather than impose export restrictions. Carbon sequestration and carbon trading opportunities for developing countries should be explored as an alternative source of income to unsustainable biofuels feedstock production.

The perception that developed countries are demanding inordinately stringent criteria from developing countries may further complicate the international discussion on GHG emissions mitigation. Developing countries are likely to argue that overly stringent standards jeopardize their opportunities to industrialize, whereas no such constraints were placed on developed countries during their industrialization.

The lack of international standards curtails trade because exporters are left to comply with many different standards. Moreover, protectionist interests may use sustainability standards as a means of sidestepping the cornerstones of WTO law, namely the principles of national treatment and non-discrimination. While the EC has stated that any EU sustainability standard or set of standards must not present a barrier to trade, European interest groups have argued that a certification system is only required for imported raw materials. They contend that, since EU agricultural feedstocks already abide by the Common Agricultural Policy's rules, guaranteeing biodiversity, crop rotation, and protection of the environment, imports must meet equivalent requirements.[39] The tendency and temptation to favor the use of domestic feedstocks for biofuels production in the United States and the EU risks becoming more significant if such domestic production is not also held to an effective set of biofuels sustainability standards.

[38] The Brundtland Commission was convened by the United Nations in 1983 to address concerns about environmental degradation and natural resource management. The UN General Assembly determined that environmental problems are global and that all countries need to establish sustainable development policies. The Report of the Brundtland Commission, *Our Common Future,* was published in 1987.

[39] For an example, see COPA and COGEC Reaction and Proposals to the Biomass Action Plan (Com(2005)628) and EU Strategy for Biofuels (Com(2006)34), p.6: "The European Commission is proposing to introduce a certification scheme for crops used for biofuels. COPA and COGECA stress that current legislation and the implementation of cross-compliance.... guarantee the respect, in Community production, of biodiversity, crop rotation and the environment."

V. WTO QUESTIONS: APPLYING TRADE OBLIGATIONS TO BIOFUELS

In addition to international standards, a clarification of whether and how international trade obligations apply to the biofuels sector might be useful to counter protectionist tendencies. The range of issues in need of clarification has already been outlined exhaustively in a previous IPC publication,[40] and the preceding section on standards included a discussion of WTO rules for standards. In this section, we briefly consider issues pertaining to market access and subsidies, which we deem to be the most relevant in the U.S. and EU context.

The high tariffs placed on ethanol by both the United States and the EU clearly demonstrate a wish to limit imports. The U.S. secondary tariff on fuel ethanol specifically was established in 1980 to offset the benefit of an excise tax credit. This arguably was a violation by the United States of its commitment under GATT Article II to stick with its schedule of concessions. This line of reasoning, however, is moot since the United States was able to bind its secondary tariff in its schedule as a permitted "other duty or charge." Attempts to limit high tariffs on ethanol must therefore be pursued in multilateral or bilateral negotiations. Final tariff reductions on biofuels as a result of the Doha Round would depend on whether they would be considered to fall under the remit of WTO members' agricultural or so-called "Non Agricultural Market Access" (NAMA) commitments (this issue is explored in section 2 below). The possibility to fast track tariff reductions and non-tariff barriers to both environmental goods and services is foreseen in paragraph 31 (iii) of the Doha Ministerial Declaration, but negotiations to date have not reached agreement on what type of products and services should fall under this category.

Questions of how WTO disciplines apply to the biofuels sector are likely to come to the forefront of the international trade agenda. The question of whether biofuels subsidies (in combination with trade restrictions) should count as trade-distorting support to agricultural producers has already been flagged by Brazil, which is considering incorporating biofuels subsidies into a WTO case against U.S. farm subsidy programs. These may be addressed in piecemeal fashion through litigation, or WTO members may opt to proactively address them. It is not our intent to encourage litigation in the WTO, but we believe it is important for the EU and United States to consider three fundamental questions that might arise in a WTO context as they shape their biofuels policies:

1. If high tariffs were found to limit the benefits of tax incentives to domestic producers, such measures could be found to constitute a violation of the National Treatment obligation of the GATT. Article III.2 of the GATT, which pertains to internal taxation measures, requires WTO members to, first, tax "like" imported and domestic products identically and, second, tax "directly competitive or substitutable products" in similar ways so as not to afford protection to domestic production. The question of whether different types of biofuels are "like" or "similar" products would need to be tackled.

2. If tax incentives were found to discriminate against imports, a further question of whether such subsidies should be considered as agricultural or industrial subsidies arises. Given the lack of up-to-date notifications of agricultural domestic support to the WTO's Committee on Agriculture,[41] it is not clear into which category such subsidies fit. There are a number of facts to consider. Biofuels are fuels, but they are produced from agricultural feedstocks. Biofuels tax incentives go to biofuels producers, but may be found to provide pass-through subsidies to agricultural producers. There is also the interesting discrepancy of how biofuels are classified under the Harmonized Commodity Description and Coding System (HS) of the World Customs Organization, which through Annex 1 of the Agreement of Agriculture (AoA), determines their coverage under that agreement. Ethanol, placed into Chapter 22 of the HS, is included on this list and thus appears to fall under the Agreement on Agriculture, whereas biodiesel, under HS Chapter 38, is categorized as an industrial product.

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[40] Howse, Robert, Petrus van Bork, and Charlotte Hebebrand, "WTO Disciplines and Biofuels: Opportunities and Constraints in the Creation of a Global Marketplace." IPC Discussion Paper. October 2006. Available at: http://www.agritrade.org/Publications/wto_biofuels.html. Last viewed October 1, 2007.

[41] The last U.S. notification was for 2001; the EU's most recent notification was for 2003/2004.

3. Assuming that biofuels subsidies would qualify as agricultural subsidies, it is still unclear into which category of subsidies they would fall. The 1995 Agreement on Agriculture negotiated during the Uruguay Round of negotiations established different categories of domestic support. Domestic support tied to production, also known as "amber box support," is considered to be the most trade-distorting, and WTO members committed themselves to specific reduction requirements of such support. Another category of non- or minimally trade distorting domestic support, so-called "green-box support," is not subject to reduction requirements, but to qualify for this category, a lengthy set of criteria spelled out in Annex 2 of the AoA must be met. To qualify as green box support, government payments (or government revenue foregone) may not have the effect of providing price support to producers (Annex 2, 1(b)). Annex 2 also includes criteria to determine whether structural adjustment assistance provided through resource retirement programs qualifies for the green box category. These criteria encompass the requirement that such payments "shall not require or specify any alternative use for such land or other resources which involves the production of marketable agricultural products" (Annex 2, 10(c)).

The question of whether biofuels subsidies (in combination with trade restrictions) should count as trade-distorting support to agricultural producers has already been flagged by Brazil, which is considering incorporating biofuels subsidies into a WTO case against U.S. farm subsidy programs. If biofuels subsidies would fit into the amber box, the United States and the EU may risk exceeding their existing commitments.

WTO member-states have already brought cases against the EU and the United States for illegal support to their agricultural sectors. If biofuels subsidies would fit into the amber box, the United States and the EU may risk exceeding their existing commitments.

VI. RIPPLE EFFECTS ON DEVELOPING COUNTRIES

Biofuels policies in the United States and the EU have implications far beyond their own territories.

Given the comparative advantage of many developing countries in producing agricultural commodities, if the United States and the EU were to continue diverting a substantial amount of their domestic agricultural crops to biofuels production, some developing countries may be able to benefit. They could meet some of the resulting food demand that would no longer be supplied by U.S. and EU producers. Even with yield improvements and expanding production, the population and income growth in developing countries will increase the demand for agricultural commodities. Developing countries will be able to fill the export gap as increased production in the EU and the United States is diverted to biofuels.

The demand created by U.S. and EU biofuels mandates, in combination with increased food demand in emerging economies and supply restrictions due to inclement weather, has contributed to commodity price increases. Developing country exporters welcome higher prices.

Such opportunities, however, are likely to be outweighed by two factors: first, the potentially limited export opportunities for biofuels and feedstocks produced in developing countries; and, second, the negative impact that increased commodity and food prices may have on food security in net food-importing developing countries. Non-discriminatory U.S. and EU biofuels policies and standards would certainly lead to a vast expansion of export opportunities for some developing countries, but given the disparate agricultural sectors in developing countries, it would be disingenuous to argue that such opportunities would exist for all developing countries. Moreover, such a position would imply that the greatest benefits from biofuels for developing countries lie in exports to meet ambitious U.S. and EU biofuels mandates. However, domestic biofuel uses may hold much greater promise for developing countries — both from an environmental and economic development perspective.

> Non-discriminatory U.S. and EU biofuels policies and standards would expand export opportunities for some developing countries.

U.S. exports of key commodities dominate global markets (Table 7). With cellulosic ethanol not yet commercially available, it is expected that corn will remain the U.S.'s most important biofuels feedstock for at least the next five to fifteen years. Corn production to produce ethanol may limit U.S. supplies for meeting rising global demand. Other U.S. commodity exports may decline as producers increasingly shift to corn. As a result, some developing countries may fill this potential vacuum on the global market.[42]

[42] Likely beneficiaries are developing countries with production capacity for exporting grains and oilseeds, (i.e. Argentina, Brazil and South Africa). Josling, Tim, Dan Sumner, Robert Thompson, Mary Chambliss, and Kara Laney. "The US Farm Bill: Implications for Developing Countries." IPC Issue Brief 25. September 2007. Available at: http://www.agritrade.org/Publications/farm_bill_briefs.html. Last viewed October 1, 2007.

Table 7: U.S. Share of World Production and Trade for Selected Commodities, Yearly Average, 2002-2005

Commodity	U.S. Exports: Share of U.S. Production	U.S. Share of World Production	U.S. Share of World Exports
Corn	18%	40%	61%
Soybeans	35%	38%	44%
Wheat	50%	9%	25%
Cotton	70%	20%	40%
Rice	52%	2%	13%

SOURCE: Congressional Research Service, http://www.cnie.org/NLE/CRSreports/07May/RL33697.pdf.

On the European side, developing countries are faced with greater export opportunities for oilseeds and vegetable oils as a result of the expanding production of EU rapeseed for biodiesel production and the resulting demand for other oils for human consumption.

Gains for developing countries with export capacity would not only derive from increased marketing opportunities, but also from the significant price increases which have already occurred and are forecast to remain for several years. Several WTO dispute-settlement rulings, as well as the Doha Round negotiations, have clearly demonstrated the negative impact on developing country producers of international price depression caused by trade-distorting subsidies of OECD countries. For example, studies suggest that U.S. subsidies push down world prices by 9 to 10 percent for corn, 6 to 8 percent for wheat, 4 to 6 percent for rice, and 10 to 15 percent for cotton.[43] The competition among feed users, ethanol processors, and exporters has already driven the price of corn up from less than $2.00/bushel at the end of 2005 to more than $3.17/bushel in 2007. Wheat and soybean prices in late 2007 were also almost 50 percent higher than in the previous year.[44] For producers suffering from depressed prices, this turn of events is fortuitous. For developing countries that are net food importers, such price hikes worsen their economic problems. The poor in the least developed countries often spend at least 50 percent of their income on food; higher prices jeopardize food security and worsen poverty.

[43] Josling, Tim, Dan Sumner, Robert Thompson, Mary Chambliss, and Kara Laney. "The US Farm Bill: Implications for Developing Countries." IPC Issue Brief 25. September 2007. Available at: http://www.agritrade.org/Publications/farm_bill_briefs.html. Last viewed October 1, 2007.

[44] U.S. Department of Agriculture, National Agricultural Statistics Service. *Agricultural Prices.* Washington, DC. August 31, 2007. Available at: http://usda.mannlib.cornell.edu/usda/current/AgriPric/AgriPric-08-31-2007.pdf. Last viewed September 4, 2007.

Table 8: Reference International Commodity Prices for Sugar, Maize, Wheat, 2005-2007

Commodity	Average price for 2005 (dollars/ton)	Peak price since May 2005 (dollar/ton and week ending)	Average price, 1 January 2007 through 1 May 2007 (dollar/ton)	Percentage change,nominal terms, 2005 to mid-May 2007
Sugar[a]	$218	$406 (Feb. 3, 2006)	$231	6%
Maize[b]	$109	$203 (Feb. 23, 2007)	$183	68%
Wheat[c]	$150	$229 (Oct. 20, 2006)	$191	27%

a. Based on weekly averages of International Sugar Organization (ISO) daily price, expressed in U.S. centers per pound
b. U.S. No.2, Yellow, price at U.S. Gulf ports (Friday quotations), expressed in dollars per short ton.
c. U.S. No.2, Soft Winter Wheat, price at U.S. Gulf ports (Tuesday quotations)

SOURCE: Data from Food and Agricultural Organization, "International Commodity Prices" website, (www.fao.org/es/esc/prices), in Doornbosh, Richard and Ronald Steenblik. *Biofuels: Is the Cure Worse than the Disease?* OECD. Paris, 11-12 September 2007.

Table 9: Reference International Commodity Prices for Rapeseed Oil, Soybean Oil, Crude Palm Oil, 2005-2007

Commodity	Average price for 2005 (dollars/ton)	Peak price since May 2005 (dollar/ton and month)	Average price, January-February 2007 (dollar/ton)	Percentage change, nominal terms, 2005 to avg. 2007 to date
Rapeseed oil[a]	$669	$856 (Dec. 2006)	$800	19%
Soybean oil[b]	$545	$714 (Feb. 2007)	$706	29%
Crude palm oil[c]	$422	$605 (Feb. 2007)	$602	43%

a. Monthly averages of ex-mill price (f.o.b.), Netherlands
b. Monthly averages of ex-mill price (f.o.b.), Netherlands
c. Monthly averages of import price (c.i.f.), north-west Europe

SOURCE: Data from Food and Agricultural Organization, "International Commodity Prices" website, (www.fao.org/es/esc/prices), in in Doornbosh, Richard and Ronald Steenblik. *Biofuels: Is the Cure Worse than the Disease?* OECD. Paris, 11-12 September 2007.

Any gains for developing countries in their efforts to meet the increased demand for food commodities may, however, be offset in the longer run by limited market opportunities for exports of biofuels and biofuel feedstocks, if the EU and the United States retain an overly domestic focus on their biofuels usage. A comparative advantage in producing agricultural commodities translates into a comparative advantage for producing biofuels feedstocks. Unlike the United States and the EU, which have virtually no new arable land to bring into production, many developing countries have room to expand agriculture.[45] Untapped arable land and possibly

[45] The UN's Food and Agricultural Organization (FAO) statistics show that the EU and the United States use about half of their arable land for agriculture. However, most of the other half is already devoted to alternative uses (buildings, roadways) and is therefore not likely to be brought into agricultural production.

larger yield increases relative to those of the United States and the EU enhance the potential of developing countries with agrarian resources to produce biofuels for export markets. Many developing countries are located in the Tropics with climates conducive to long growing seasons. They could produce biofuels feedstocks throughout more months of the year than is possible in the temperate climates of the EU and the United States. Furthermore, the tropical climates may support crops that can be converted into fuel more efficiently. Producing ethanol from sugarcane, for instance, requires significantly less energy than ethanol made from corn, and sugarcane ethanol has lower carbon emissions. Sugarcane grows well in tropical regions. Lastly, the costs of labor and land are lower in developing countries. Even with the cost of transporting biofuels or biofuel feedstock from a developing country to the EU or U.S. market, and the machinery costs, the developing country product may still be cheaper because of these lower labor and land costs.

An important reason why existing biofuels trade preferences are not being met may be the lack of certainty that such preferences entail since they must be renewed through legislative processes. Moreover, such preferences can include overly stringent eligibility criteria.

The EU and the United States do offer preferential trading schemes in biofuels to some developing countries. African, Caribbean, and Pacific countries, all least developed countries covered under the Everything But Arms scheme, and countries that qualify for the Generalized System of Preferences (GSP) Plus program — all of these countries can import ethanol into the EU market at a reduced or zero tariff rate. Ethanol from Canada and Mexico enters the United States duty-free under the North American Free Trade Agreement. The United States also has a complicated arrangement with many countries in the Caribbean that exempts a limited quantity of imported ethanol from the 54-cent tariff. Under the Caribbean Basin Initiative (CBI),[46] ethanol that is produced from at least 50 percent of a participating country's feedstock may be imported duty-free. Additionally, countries may export duty-exempt the equivalent of up to seven percent of the United States's domestic market for ethanol, or 60-million gallons, whichever is greater, of dehydrated ethanol from feedstock imported from third countries.

In practice, CBI countries have not utilized the provision for exporting ethanol produced from their own domestic feedstocks to the United States. However, third countries have used this exemption to sell ethanol to the U.S. market duty-free. Brazil and some European countries import hydrous ethanol into CBI-participating countries. In these locations, the ethanol is dehydrated and then imported into the United States under the cap for non-local feedstock ethanol. Presently Jamaica, Trinidad and Tobago, Costa Rica, and El Salvador operate dehydration plants. Imports under this scheme have typically been far below the seven percent threshold, although the fill rate of the tariff rate quota did increase substantially from 43 percent in 2005 to 77 percent in 2006 as U.S. demand surged.[47]

[46] The Caribbean Basin Initiative applies to Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, the British Virgin Islands, Costa Rica, Dominica, the Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, the Netherland Antilles, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago.

[47] United States International Trade Commission Interactive Tariff and Trade Dataweb. Available at: http://dataweb.usitc.gov/.

A case in point is Pakistan, which was the second largest ethanol exporter to the EU. The country had participated in the EU's GSP anti-drug regime until its discontinuation in 2005. It was not included in the successor GSP Plus regime because its ethanol exports slightly exceeded the cut-off of one percent of total EU imports allowable under that scheme. This decision followed a complaint from the Committee of Industrial Ethanol Producers of the EU (CIEP), which alleged that Pakistan and Guatemala were dumping exports of ethyl alcohol, thus causing material injury to the EU industry.[48]

A further reason for this underutilization of preferences is arguably a lack of competitiveness and production capacity in many developing countries. The Doha Round trade negotiations have clearly demonstrated that market access for agricultural products — albeit, very important — does not automatically translate into an expansion of exports. The round's "Aid for Trade" Initiative emphasizes the need for more targeted development assistance to assist developing countries in taking greater advantage of new trade opportunities. Given the enormous needs in infrastructure alone, it would be unrealistic to view trade as a panacea. Equally important is the need for many developing countries to implement domestic policies which foster greater private sector development.[49] Improved market opportunities in the United States and the EU would certainly be helpful in attracting greater investment in developing countries interested in building a biofuels industry. This should not, however, diminish the need for addressing substantial supply-side constraints, which hamper the competitiveness of developing countries' agricultural and biofuels sectors.

Additionally, as this paper has demonstrated, biofuels standards may also limit export opportunities for developing countries. Even if such standards meet the highest tests of scientific justification and non-discrimination, they may be difficult for developing countries to comply with. In the trade realm, the WTO has a long-standing principle of "Special and Differential Treatment" (SDT), which allows the least-developed countries to be exempt from certain liberalization commitments and grants developing countries less ambitious commitments and longer transition periods. A similar approach for the implementation of and compliance with standards does not exist. If a standard exists to protect public health or the environment, it is not appropriate to be lenient in enforcing that standard — even if it proves difficult for developing countries to meet it. SDT in the area of standards, therefore, has generally been understood to take the form of technical and capacity building assistance to help developing countries meet standards. The more complex a biofuels sustainability standard becomes, the greater the need is to assist developing country producers in meeting such standards.

Biofuels standards may limit export opportunities for developing countries. Even if such standards meet the highest tests of scientific justification and non-discrimination, they may be difficult for developing countries to comply with.

This paper has argued that it would be erroneous for the EU and the United States to view biofuel production primarily as an outlet for domestically produced agricultural feedstocks. Such a view has important energy and cost implications and risks adversely affecting developing countries. Concurrently, it would be erroneous for developing countries to view biofuels strictly as an opportunity to market their biofuels and feedstocks to OECD countries, which can afford ambitious mandates and incentives. Such a strategy would, first, place too much trust in a market opportunity which has not yet withstood the test of time and, second, overestimate the ability of many developing countries to establish large-scale production and exports, considering their considerable supply-side constraints and limited resources to incentivize biofuels production, relatively to the United States and the EU. It could also present sustainability and food security challenges.

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[48] USDA Foreign Agricultural Service. "EU-25 Agricultural Situation: Pakistan, EU's second largest ethanol exporter, loses privileged status." Global Agriculture Information Network, Report No. E35187. September 27, 2005. Available at: http://www.fas.usda.gov/gainfiles/200509/146131044.pdf. Last viewed October 1, 2007.

[49] [0] For an overview of the supply side constraints which limit production and trade opportunities in the agricultural sector in Africa, see proceedings of the June 2007 IPC/COMESA/Partnership to Cut Hunger and Poverty in Africa Seminar at http://www.agritrade.org/events/strengthening_african_markets.html.

Moreover, this approach would ignore the potential benefits that increased domestic production and consumption of biofuels may hold for developing countries, in terms of addressing the very serious energy and environmental constraints that many of them face and the potential to promote economic development. Rising fossil fuel prices are especially untenable in poor, energy-dependent countries. Although many developing countries rely greatly on traditional uses of biomass (i.e., firewood and charcoal), more sophisticated approaches would prove to be more economic and environmentally sustainable. Since poor countries lack the government resources to establish generous incentives, the biofuels industry is much more dependent on investment. Even the prospect of potential trade opportunities into the sizeable U.S. and EU markets will help attract investment.

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UN agencies and development NGOs view in particular small-scale biofuels production in developing countries as an opportunity to break the vicious cycle of insufficient access to affordable and sustainable energy sources and debilitating poverty, in particular in rural sectors. Under its Biofuels Initiative, the UN is promoting biofuels as a solution to the dearth of energy options available to most poor people in developing countries. The UN is also addressing concerns related to supply-side constraints, which may limit developing countries' ability to market biofuels, and food security needs, which may be exacerbated by the production of crops for fuel instead of food. For this reason, the UN is devoting research resources to crops like jatropha, a non-edible oilseed crop, which can grow on marginal land in many developing countries. Because it does not compete with food for land use or consumption, jatropha, and crops like it, may be an attractive bioenergy solution for developing countries.

VII. CONCLUSIONS

Biofuels have emerged in substantial quantities as additives to and substitutes for transport fuels. There is a great deal of uncertainty about which technologies and feedstocks will ultimately prove to be the most efficient in terms of reducing GHG emissions and providing affordable, sustainable energy, and even on how best to measure such characteristics. Questions also exist about whether other uses of biomass may be more promising than biofuels for transport and about what may ultimately prove to be the best mix of biomass and non-biomass based renewable energy sources. This paper does not attempt to address these questions, which are best left to entrepreneurs, energy specialists, and scientists. As the EU and the United States move to support their biofuels industries before these answers are clear, this paper cautions policymakers to clarify their intentions and ensure that domestic economic interests do not outweigh the EU and U.S. desire to promote the most promising renewable energy resources.

Considering the amount of government support to the biofuels industry, it is important for governments to clarify the intent behind such support:

- It is unrealistic to view biofuels as a panacea for achieving energy security, reducing GHG emissions, and establishing new markets for politically powerful agricultural sectors on both sides of the Atlantic.

- Although domestic interests will understandably want to benefit from incentives, they should not do so disproportionately if the overriding objective of promoting biofuels is to reduce dependence on fossil fuel, in particular, if they do not offer biofuels with relatively greater energy efficiency and greenhouse gas reduction rates.

- Energy security should not be mistaken for energy self-sufficiency. Real energy security lies in a diversification of sources, which mitigates the impact of potential supply disruptions. If the objective is to secure new energy supplies, efficiency and cost-effectiveness should be the primary drivers — not national origin.

This intent should be mirrored in the establishment of EU and U.S. mandates, tax incentives, and tariffs:

- In the absence of viable second-generation biofuels, care must be taken to ensure that ambitious biofuels mandates do not serve to slow efforts to develop improved biofuels and or other energy applications of biomass. Incentives, tariffs, and standards that are structured primarily to promote domestic production of certain biofuels will retard the development of other more energy — and cost-efficient biofuels. The viability of second-generation biofuels and other biomass-based renewable energy sources may also be limited due to vested interests in current technologies.

- Until the advent of second-generation biofuels, the most energy efficient and sustainable first-generation biofuels should be promoted, regardless of national origin. This is not achieved through discriminatory tax incentives and high tariffs.

- Widening the access of imports to U.S. and EU domestic markets would help reduce upward pressure on commodity prices and lower the high costs of biofuels production, decreasing the risk of a backlash against government subsidies.

- Clarifying how WTO rules apply to the biofuels sector can pave the way for less distorted government support policies. The purpose of such a clarification would not be solely to facilitate trade, the existence of which would still not be guaranteed. More importantly, a clarification of market access and domestic support rules in the biofuels sector would help ensure that incentives truly promote the most efficient and sustainable biofuels.

International standards are necessary to ensure that biofuels play a productive role in the push for renewable energy sources:

- Ambitious mandates require a means to ensure that they are met in a sustainable fashion. Global sustainability standards can point the way towards optimal biofuels and feedstocks. Given the myriad of interests, and the difficulty of implementing standards that try to address too many of these interests, it is important to set priorities. The reduction of greenhouse gases should be the top priority.

- If the objective is to secure more sustainable energy supplies, an international consensus on what constitutes sustainability and on how best to certify such sustainability is absolutely vital. Without an international consensus on what constitutes sustainable biofuels production, environmental concerns can conveniently be used to cloak protectionist interests.

- While U.S. interest in biofuels is mainly driven by the necessities of achieving greater energy security, EU interest, in contrast, stems largely from concerns about climate change. This transatlantic divergence will certainly not facilitate an international consensus on what constitutes sustainable biofuel production.

- International technical standards for biofuels should also be harmonized. Without widespread agreement on feedstock-neutral quality specifications, divergent technical standards will be used for protectionist purposes.

The United States and the EU should consider the impact of their biofuels support policies on developing countries:

- Increased prices and new market opportunities resulting in part from ambitious EU and U.S. mandates, combined with increasing use of U.S. and EU feedstocks for biofuels production, will be welcome by developing countries with good production and export capacity. Rising food prices, however, hit net food importing developing countries especially hard.

- Considering the comparative advantage of many developing countries in agriculture, increased U.S. and EU openness to imports could provide economic growth opportunities for those countries with large production capacities.

- Other developing countries should be encouraged to explore the potential for domestic and small-scale biofuels production, which promises to be effective in the ongoing struggle for greater access to more sustainable energy sources and in the fight against poverty. As these countries do not have comparable means to subsidize their biofuels industry, the prospect of trade will facilitate investment.

- For international sustainability criteria to be effective, they must truly be global and incorporate the interests and concerns of developing countries. Given the possibility that these standards may limit economic growth in developing countries, care must be taken to help developing countries comply.

ANNEX A

Biofuels Production 2006

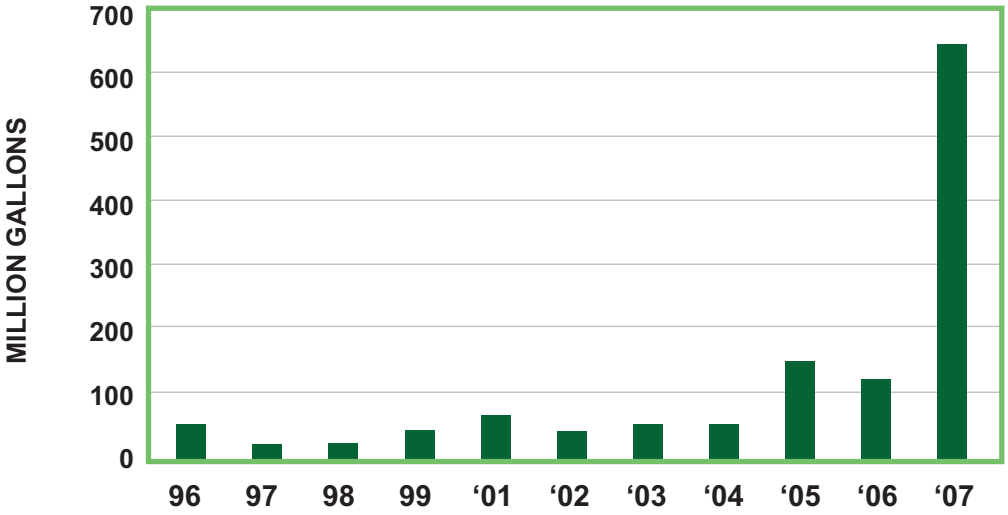
	Ethanol (million liters)	Biodiesel (million liters)
United States	18,397	946.3
Brazil	17,860	40[1/]
EU-27	1,717[2/]	5,856[2/]
China	1,647.1	340.8[2/ 3/]
Australia	605.2[2/ 4/]	524.1[2/ 4/]
India	250	0
Canada	240[2/]	9[1/]
Colombia	340	0[5/]
Argentina	0	200[2/]
Thailand	156[6/]	--
Indonesia	79.5	45.6
Pakistan	46.2	0
Korea	0	45.8
Mexico	0	3.7[2/]

1/ 2005.
2/ Includes non-fuel use.
3/ 2007 estimate.
4/ 2007 estimate.
5/ Biodiesel plants under construction.
6/ Includes biodiesel and ethanol.

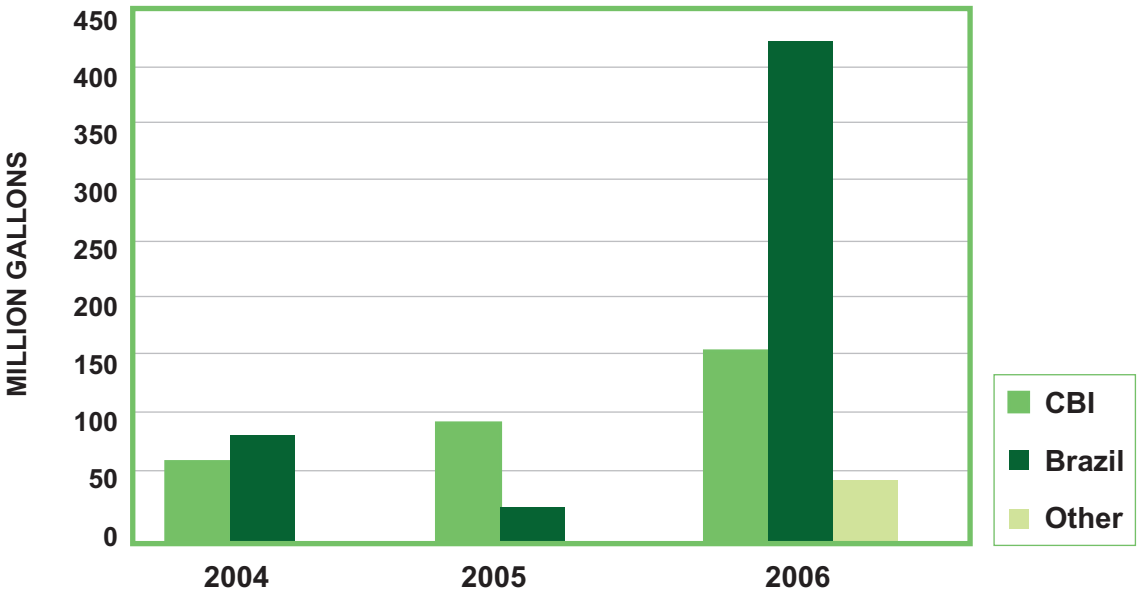
SOURCE: USDA Foreign Agricultural Service, Global Agricultural Information Network Reports.

ANNEX B

U.S. Imports of Ethanol for Fuel



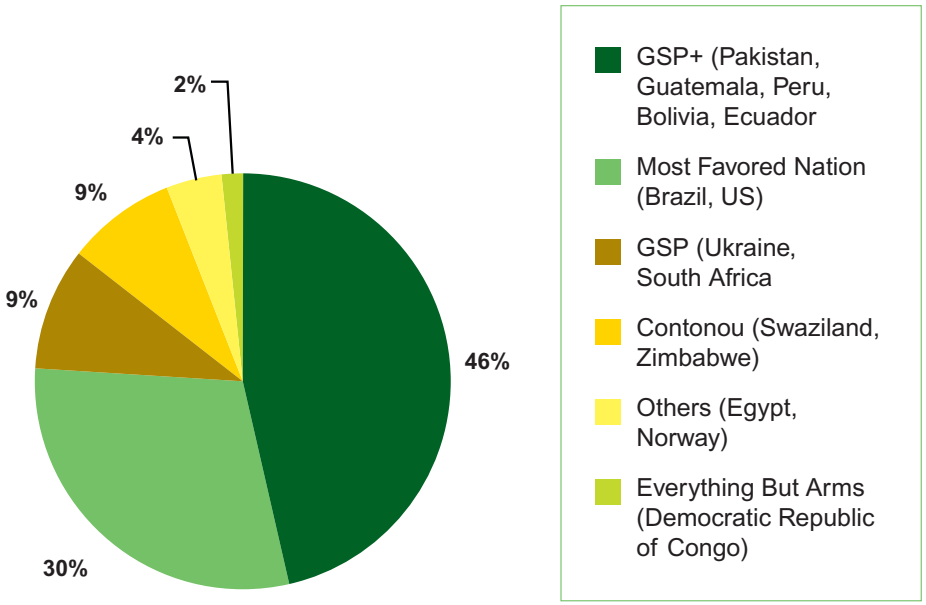
U.S. Imports by Source



SOURCE: United States International Trade Commission Interactive Tariff and Trade Dataweb. Available at: http://dataweb.usitc.gov/.

ANNEX C

Ethanol Imports to EU, 2002-04



The EU's MFN bound and applied tariffs on biofuels and vegetable oils for biodiesel production

CN code and description	MFN bound tariff	*Ad valorem* equivalent (2004–2005 averages*)	Tariff rate quotas with reduced tariffs
Ethanol			
2207 10 00 *undenatured alcohol with an alcohol content of >80 percent*	€ 19.2/hl	63 percent	no
2207 20 00 *Denatured alcohol*	€ 10.2/hl	39 percent	no
Biodiesel			
3824 90 99 99 *Other*	6.5 percent		no
Vegetable oil for biodiesel production			
15071010 *crude soy oil for industrial use*	3.2 percent		no
1511 10 10 *crude palm oil for industrial use*	free		no
1512 11 10 *crude sunflower oil for industrial use*	3.2 percent		no
1514 11 10 *crude rape oil for industrial use*	3.2 percent		no

*Ad valorem equivalents (AVE) calculated based on import unit values from COMTRADE.

SOURCES: TARIC and COMTRADE databases *in Biofuels - At What Cost? Government support for ethanol and biodiesel in the European Union.* Geraldine Kuta, Carina Lindberg and Ronald Steenblik. Global Subsidies Initiative. Geneva, October 2007.

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The International Food & Agricultural Trade Policy Council (IPC) promotes a more open and equitable global food system by pursuing pragmatic trade and development policies in food and agriculture to meet the world's growing needs. IPC convenes influential policymakers, agribusiness executives, farm leaders, and academics from developed and developing countries to clarify complex issues, build consensus, and advocate policies to decision-makers.

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