

U.S. Climate Change Policies and International Trade Policies: Intersections and Implications for International Negotiations

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Abstract

U.S. climate change policymaking has intersected with international trade, investment and technology transfer policymaking on numerous occasions and in diverse policymaking contexts. Such intersections will become increasingly important in the future. Five kinds of intersections and examples of each are analyzed in the paper:

- (1) offsetting border measures that address international competitiveness concerns, as in legislative proposals in the Congress;
- (2) tariffs and non-tariff barriers to trade, investment and technology transfer for climate change mitigation or adaptation;
- (3) programs that promote exports, foreign direct investments and technology transfers, especially to emerging economies;
- (4) international climate change technology cooperation agreements; and
- (5) international trade disputes, such as the U.S. complaint about the EU plan to include aviation in its Emissions Trading Scheme.

These intersections of climate change issues with international trade-investment-technology transfer issues reveal tendencies in the institutional and attitudinal contexts of U.S. policymaking that will be among the key determinants of U.S. policies in negotiations on the future of the international climate change system as well as the international trade system. One of the implications for international climate negotiations is that the U.S. may advocate the inclusion of import border measures to address free rider problems in the post-2012 multilateral climate change regime. An implication for international trade-investment-technology transfer negotiations is that linkages between goods and services, and between industrial and agricultural issues will need to be addressed more explicitly and systematically. There are also international venue issues that need to be addressed. These and other implications are considered in the concluding section of the paper.

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“Part of the aim of [the Doha] negotiations is to help open markets to clean technology — whether in terms of the goods or services that it entails. That is a very legitimate aim, particularly in light of the enormous threat of climate change that we all face.” Pascal Lamy, Director-General of the WTO, opening address at the WTO Forum, 4 October 2007.

“The reduction of tariff and non-tariff barriers for low-carbon goods and services, including within the Doha Development Round of international trade negotiations, could provide further opportunities to accelerate the diffusion of key [climate friendly] technologies.” The Stern Review of The Economics of Climate Change, 2006, p. xxv.

“One way to look at the Kyoto Protocol - and whatever global agreements will follow - is as an investment and trade agreement.... [A]n important hidden imperative behind Kyoto is the creation of an open global market in environmental technologies....[W]herever possible, restrictive national rules on investment or services trade that prevent this transfer of expertise and technology must be removed.” EU Trade Commissioner Mandelson, speech on 18 December 2006.

1. Context, Purpose and Scope of the Study

The quotations above demonstrate that climate change and trade agendas have already intersected at the international level in the context of EU and WTO policymaking. In addition, developments within the United States in government climate change policymaking and international trade policymaking have also already led to intersections of these two policy domains which had previously been independent of one another. The intersections have become prominent in Congress concerning policymaking on future climate change policies as well as in policies already being implemented by the executive branch of the government. The intersections, furthermore, reveal important tendencies in the institutional and attitudinal contexts of U.S. climate change policymaking, and they will have significant consequences for U.S. policies in negotiations on the future of the international climate change system and international trade system.

The purpose of this paper is to analyze the nature of the intersections between U.S. climate change policies and international trade policies and to assess their implications for international negotiations concerning the multilateral climate change regime and the multilateral trade regime. The paper includes international investment and technology transfer policies, along with trade in goods and services, because they are all highly interdependent types of international business transactions. The term “trade” is thus used in the title and elsewhere in the paper as a short-hand expression that includes investment and technology transfer, as well as trade in goods and services.

The paper focuses on the following five kinds of intersections:

- offsetting border measures that address international competitiveness concerns and free rider problems of international climate change agreements;

- tariffs and non-tariff barriers to trade, investment and technology transfer of goods and services for climate change mitigation or adaptation;
- programs that promote exports, foreign direct investments and technology transfers, especially to emerging economies;
- international climate change technology cooperation agreements; and
- international disputes, such as the U.S. complaint about the EU plan to include aviation in its Emissions Trading Scheme.¹

Until recently, studies of climate-trade interactions were mostly institutional and/or legal studies that were principally concerned with relationships between the multilateral climate change regime, as embodied in the UN Framework Convention on Climate Change (FCCC) and its Kyoto Protocol, on the one hand, and the multilateral trade regime, as embodied in the World Trade Organization (WTO), on the other. A specific concern of this literature has been the identification of potential win-win arrangements and avoidance of lose-lose scenarios. See Assuncao (2000); Brack, Grubb and Windram (2000), Brewer (2003; 2004), Charnovitz (2003, 2005), Hoerner and Müller (1996), Müller (2002), National Board of Trade of the Government of Sweden (2004), Petsonk (1999), Sampson (1999, 2000), Tarasofsky (2005), Werksman (1999), Werksman and Santoro (1999), Werksman, Bauman and Dubash (2001) and Zhang (1998). For broader analyses that encompass multilateral environmental agreements in general and their interactions with the WTO, see Palmer and Tarasofsky (2007).²

A study at the World Bank (2008) has enriched the climate-trade literature by an extensive econometric analysis of the effects of national carbon taxes and energy efficiency measures on international trade patterns. A study for the EU (2007) has analyzed climate-trade issues for several energy-intensive sectors as well as international transportation issues. In addition, recent studies by Sell, Sugathan, Gueye, Cheng and others at the International Centre for Trade and Sustainable Development (ICTSD, 2006) have focused on specific industries and issues concerning climate-trade intersections. Also see the several earlier econometric studies available in Böhringer and Löschel (2004). A brief analysis by Cosbey (2007) for the International Institute for Sustainable Development (IISD) in Canada identifies areas where immediate action could enhance the contributions of international trade and investment to climate change mitigation. Finally, many studies have addressed the international competitiveness and trade

¹ Although this paper does not examine the budget process, there are in fact climate-trade issues that emerge every year in the annual budget cycle - whether through authorizations and/or appropriations. These issues are addressed in both Congressional and executive branch budgeting processes (see Brewer, 2006b, 2007c, for additional details).

² As I have suggested elsewhere (Brewer, 2004b), there are four terms that encapsulate the kinds of generic environmental policy intersections with trade and foreign direct investment (FDI): Environment Related Trade Measures (ERTMs), Environment Related Investment Measures (ERIMs), Trade Related Environment Measures (TREM), and Investment Related Environment Measures (IREMs). For climate friendly goods and services, in particular, the following are examples: tariffs on biofuels (ERTMs), restrictions on FDI in wind turbine manufacture (ERIMs), subsidies for production of renewable fuels (TREM), government R&D subsidies for investments in pilot projects in carbon sequestration (IREMs).

implications of emissions trading schemes; see especially the Chatham House study by Cosby and Tarasofsky (2007) and the several items in a special edition of the journal *Climate Policy* (Volume 6, Issue 1, 2006) edited by Grubb and Neuhoff.

As a contribution to the literature on climate change-international trade intersections, the present paper emphasizes specific policy issues in the U.S. and the domestic institutional and attitudinal tendencies that shape U.S. policies. Recent and prospective changes in domestic political conditions in the U.S., as well as the evolution of the international negotiating agendas for both climate change and trade, indicate the need for a detailed focus on U.S. policy intersections. The changing domestic political conditions include shifts in the party control of Congress and concomitantly increased legislative activity on climate change issues, the increasing responsiveness of business to climate change issues, the increasing public support for action on climate change, and the prospective changes in the administration in 2009. In addition, the domestic political conditions concerning trade issues, of course, also continue to evolve.

Annex I of the paper contains side-by-side comparisons of the international trade-investment-technology transfer provisions in 11 “climate change” bills and 3 “energy” bills that were pending in the U.S. Congress as of mid-November 2007. Sections 2-6 below discuss these and other types of intersections of climate and trade policies in detail.

2. Offsetting Border Measures that Address International Competitiveness and Free Rider Concerns³

The convergence of the climate change and trade agendas in the U.S. has been particularly noteworthy in GHG emissions cap-and-trade legislative proposals in Congress that would impose offsetting border measures on imports from targeted countries. Two of the many legislative proposals introduced during 2007 are relevant: One is Senate bill 1766, introduced by Senators Bingaman (Democrat from New Mexico) and Specter (Republican from Pennsylvania); the other is Senate bill 2191, introduced by Senators Lieberman (Independent-Democrat from Connecticut) and Warner (Republican from Virginia). If passed in their current form, these bills would require purchases of greenhouse gas emission allowances in order for imported goods to be allowed to enter the U.S. from countries that are not making satisfactory efforts to mitigate greenhouse gas emissions. The requirement for such purchases would be an alternative to offsetting border measures in the form of tariffs.

Abstractly, the underlying problem in the terminology of political economy is that there can be “free riders” on international agreements, in this case multilateral climate change agreements. The problem, in short, is that any given country can benefit from such an agreement without incurring the costs of participating in it. Countries, industries and firms may fear that their international competitive position is being undermined by lower energy prices in non-participating countries. In the U.S., these issues have become salient during the past year in regard to emerging economy countries (especially Brazil, China, and India). In the EU, the issues have arisen from time to time during the past several years in regard to U.S. non-participation in the Kyoto Protocol. The emphasis in the public discussions within the EU has been on the

³ This section is based in part on excerpts from Brewer (2007a).

possible imposition of offsetting tariffs, though the European Parliament’s resolution (2005/2049) uses the generic term “border adjustment measures.”⁴

U.S. Senate bill S. 1766 includes Title V, “Periodic Review and International Leadership,” which requires reviews every five years of “whether each of the 5 largest trading partners”⁵ of the U.S. has taken “comparable action” to limit GHG emissions (section 501(2)(B)(i)). “Comparable action” is defined as “greenhouse gas regulatory programs, requirements, and other measures adopted by a foreign country that are determined by the President to be, in combination, comparable in effect to the action taken by the United States to limit greenhouse gas emissions pursuant to this Act, after taking into account the level of economic development of the foreign country” (section 502(a)(2)). U.S. importers of “covered” GHG-intensive goods from countries that have been found not to have taken comparable actions must purchase “international reserve allowances” (i.e. greenhouse gas emission credits) to be issued by the U.S. government. A “covered good” is one “that the President identifies, by rule, as a greenhouse gas intensive good that is closely related to goods, the cost of production of which in the United States is affected by this Act” (section 502(a)(5)).

Senate bill S.2191, “America’s Climate Security Act,” introduced by Senators Lieberman and Warner, includes similar provisions that would require U.S. importers to purchase “international reserve allowances” to offset low energy costs for covered imported goods coming from countries that have not taken adequate measures to mitigate greenhouse gas emissions.

Table 1 on the following page provides detailed side-by-side comparisons of the two bills.

⁴ The European Parliament’s resolution (2005/2049) “... [c]alls on the Commission to take seriously into account the ‘free-rider’ problem in the area of climate change mitigation; calls on the Commission and the Member States to investigate the possibility of adopting border adjustment measures on trade in order to offset any short-term competitive advantage producers in industrialised countries without carbon constraints might have...” The Commission’s reaction to these measures has been to oppose them on the grounds that they risked exacerbating trade relations with the United States, particularly at a time when trade relations were already strained and when trans-Atlantic relations more generally were unusually conflicted over a broad range of issues. In addition, there have been concerns that such a measure would undermine support in the US among those political and business circles that have been hoping for increased EU-US cooperation on climate change issues. Finally, there have been concerns that such a tariff might be challenged in a WTO dispute settlement case, and the outcome of such a case would inevitably be uncertain. However, before leaving office in 2007, French President Chirac and Prime Minister de Villepin suggested again that such measures be undertaken, and President Sarkozy has subsequently expressed interest in the idea. European Commissioner Mandelson has responded that it would not be helpful to do so. For now, the issue is quiescent at least in public. However, since the issue is of continuing concern to the European cement industry and other GHG-intensive industries, the issue is not likely to go away.

⁵ The bill refers to “each of the 5 largest trading partners” of the United States. In 2006, the top five U.S. trade partners, *as measured by total trade (imports plus exports) of goods*, were: Canada, China, Mexico, Japan and Germany (“US Foreign Trade Statistics” of the U.S. Census Bureau, accessed at www.census.gov/foreign-trade/statistics/highlights/top/top0706.html on 31 August 2007). In its present form, the bill provides for the first such review to be completed by January 1, 2016, from an inter-agency group to be established by January 1, 2013, by which time the trade partner rankings could obviously be different.

Table 1. Border Measures on Imports to Address International Competitiveness and Free Rider Issues, as Contained in Pending U.S. Senate Climate Change Bills: Side-by-Side Comparisons of Provisions in S. 1766 and S. 2191 (November 2007)

Bill Number Title Principal Sponsoring Senators	S. 1766 Low Carbon Economy Act Bingaman (Dem) & Specter (Rep)	S. 2191 America’s Climate Security Act Lieberman (Ind-Dem) & Warner (Rep)
Key Title Number and Name (page length)	Title V - Periodic Review and International Leadership (31)	Title VI - Global Effort to Reduce Greenhouse Gas Emissions (19)
Sections	501 - Executive Branch and Congressional Review of Program 502 - International Reserve Allowance Requirements	6001 - Definitions 6002 - Purposes 6003 - International Negotiations 6004 - Interagency Review 6005 - Presidential Determinations 6006 - International Reserve Allowance Program 6007 - Adjustment of International Reserve Allowance Requirements
Core similarity: U.S. importers must buy “international reserve allowances” to offset lower energy costs of manufacturing covered goods coming from covered countries	502(f)	6006(c)
Stated Purpose (similar): protect against foreign countries’ undermining U.S. objective of reducing GHG emissions	502(b)	6002
Covered foreign countries: Countries are <i>excluded</i> from coverage if they (virtually identical): >have taken “comparable action” to U.S. >are “least-developed” >have GHG emissions below <i>de minimis</i> level (0.5% of world emissions)	502(a)(4), 502(f)(3)(B)(ii)	6001(4), 6001(6), 6006(b)(3), 6006(c)(4)(B)
Comparable action by foreign country (virtually identical): Comparable in effect, as determined by U.S. President, taking into account level of development	502(a)(2)	6001(2)
Covered goods (similar): Identified by President/EPA Admin., by rule, as GHG intensive good (primary product) that is closely related to good whose cost of production in U.S. is affected by the Act	502(a)(5)	6001(5)
Primary products (virtually identical): Iron, steel, aluminum, cement, bulk glass, or paper; <i>or</i> other manufactured product sold in bulk for a further manufacture <i>and</i> manufacture of which generates GHG emissions comparable, on emissions-per-dollar basis, to those	502(a)(12)	6001(10)

produced in U.S.		
Ref. to international rule of origin	502(a)(7)	--
International Reserve Allowances	502(f)	6006
Separate from domestic system (similar)	502(f)(4)(A)	6006(a)(2)
Price (similar): President/EPA Admin. establishes, by rule, methodology for determining prices for each year	502(f)(4)(A)(iii)	6006(a)(3)(A)
Methodology/formula for calculating international reserve allowance requirement (virtually identical): President/EPA Admin. determines on per unit basis for each covered good of each covered country	502(f)(6)(A)	6006(d)(1)
Schedule	502(f)(1)(A)	6006(c)(1)
Beginning date of International Reserve Allowance system for importer declarations	January 1, 2020	January 1, 2019

Sources: Compiled by the author from the texts of the bills as reported in www.loc.thomas.gov, accessed on 18 October 2007.

It is important to note again that there is a key difference in the form of the measure that is on the agenda in the U.S., as compared with the *tariff* that is sometimes proposed in Europe (see footnote 2 above). In particular, the proposal in the U.S. is to require U.S. importers in some circumstances to *purchase GHG emission allowances*. Such a measure could be less vulnerable than a tariff to challenge in the WTO, because it could more clearly be considered an environmental measure that would qualify as an exception under GATT Article XX(g), which allows measures “relating to the conservation of exhaustible natural resources.” For an extensive analysis of these issues, see the testimony submitted to a Congressional committee by American Electric Power (2007).

These and many other technicalities of the bills are of course subject to revision in Congressional deliberations and in any negotiations that may occur between members of Congress and the President. However, it is significant that there is already quite specific and extensive language formulated and under active consideration in the Congress. It is also noteworthy that there would be much flexibility in how the provisions of the bill would be applied to particular circumstances and in the content of the implementing regulations. Further, negotiations would be sought with target countries before the import measures are implemented.

As of late November 2007, the prospects for these and the many other climate bills under consideration in the House and Senate were uncertain. However, whatever the outcome of votes on these bills and any Presidential action that might ensue, it is clear that there is much political support for some kind of border measure provision in climate legislation that includes a mandatory cap-and-trade system. Indeed, the proposal was first vetted jointly by one of the country’s largest electricity producers, American Electric Power, together with one of the largest labor unions, The International Brotherhood of Electrical Workers. It has subsequently gained the support of major business and labor organisations. In short, the issue is now a significant item on the climate policy agenda in the United States, and with much domestic political appeal.

3. Tariffs and Non-tariff Barriers to Trade, Investment and Technology Transfer

Tariff and non-tariff barriers that restrict international trade, investment and technology transfer in industries that are directly relevant to climate change mitigation or adaptation have of course long been on the negotiating agendas of multilateral, regional and bilateral trade agreements. However, until quite recently they were not *explicitly* identified as climate change relevant issues. Now, as a result of developments in the U.S. and WTO and in other arenas, there is widespread active interest in explicitly identifying such goods and services, and including them as climate change issues on trade negotiating agendas.⁶ European Trade Commissioner Mandelson has made a specific proposal along these lines (European Commission, 2006).⁷

3.1 Industrial Goods

Two particularly pertinent lists have been developed independently by the World Bank (2008) and the Office of the U.S. Trade Representative (USTR, 2006). Both of them used the Harmonized System (HS) developed by the World Customs Organization, so that they are directly comparable. The World Bank list identified 43 climate change related products. The USTR developed a list of 51. In sum, 27 products appeared in both lists, 16 in only the World Bank list, and 18 in only the USTR list, for a total of 61. (See Annex II for a detailed comparison of the lists.)

The World Bank study reports average bound and applied tariff level data for country groups. In Table 2 below, I have added applied tariff level data for the U.S. so that its tariff levels can be compared with the average applied levels of other countries. In sum, U.S. applied tariffs are generally relatively low. They are zero in 13 of the 43 product codes listed in Table 2. They are more than 1.0 percent *lower* than the average of the high income countries in 21 categories, and within +/- 1.0 percent for 16 categories. On the other hand, there are some categories of boilers and turbines in which the U.S. tariffs of 5.2 percent and 6.7 percent, respectively, are more than the averages of low-middle income countries as well as high income countries.

⁶ Concerns that national and international efforts to address climate change might infringe on an open international trade system are evident in several provisions of the FCCC and Kyoto Protocol: Article 2:3 of the Kyoto Protocol notes that parties should “strive to implement policies and measures...in such a way as to minimize adverse effects, including the adverse effects...on international trade....” Article 3.5 of the FCCC notes that “The parties should cooperate to promote [an]...open international economic system’ and that ‘measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.’” Article 4.2 of the FCCC notes that “measures taken to combat climate change, including international ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.”

⁷ The United States has imposed de facto, firm-specific quotas on the number of hybrid fuel automobiles produced by any one manufacturer that can receive a tax credit – quotas that happen to affect only Japanese-based manufacturers, since their hybrids are the best-selling models in the U.S.

Table 2. Applied Tariff Rates on Select Climate-Friendly Technologies: Comparisons of U.S. Rates and Other Countries' Rates (percentages)

HS Code	Product Description	Average Low-Middle Income WTO Members	Average High Income WTO Members	U.S.
392010	PVC or polyethylene plastic membrane systems to provide an impermeable base for landfill sites and protect soil under gas stations, oil refineries, etc. from infiltration by pollutants and for reinforcement of soil.	13	5	4.2
560314	Non-wovens, whether or not impregnated, coated, covered or laminated: of manmade filaments; weighing more than 150 g/m2 for filtering wastewater.)	14	4	-0-
701931	Thin sheets (voiles), webs, mats, mattresses, boards and similar nonwoven products	13	4	4.3
730820	Towers and lattice masts for wind turbine	10	3	-0-
730900	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.	12	4	-0-
732111	Solar driven stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel.	18	5	0/5.7*
732190	Stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel. - Parts.	14	4	-0-
732490	Water saving shower.	19	4	-0-
761100	Aluminium reservoirs, tanks, vats and similar containers for any material (specifically tanks or vats for anaerobic digesters for biomass gasification)	11	4	2.6
761290	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.	13	4	5.7
840219	Vapor generating boilers, not elsewhere specified or included hybrid	5	4	5.2
840290	Super-heated water boilers and parts of steam generating boilers	5	4	4.3
840410	Auxiliary plant for steam, water and central boiler	5	3	3.5
840490	Parts for auxiliary plant for boilers, condensers for steam, vapour power unit	4	3	3.5
840510	Producer gas or water gas generators, with or without purifiers	5	2	-0-
840681	Turbines, steam and other vapour, over 40 MW, not elsewhere specified or included	5	3	6.7
841011	Hydraulic turbines and water wheels of a power not exceeding 1,000 kW	4	3	3.8
841090	Hydraulic turbines and water wheels; parts, including regulators	4	3	3.8
841181	Gas turbines of a power not exceeding 5,000 kW	5	2	2.5
841182	Gas turbines of a power exceeding 5,000 kW	5	2	2.5
841581	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)	13	4	1.0
841861	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)	7	4	-0-
841869	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)	7	4	-0-
841919	Solar boiler (water heater).	10	4	-0-
841940	Distilling or rectifying plant	4	3	-0-

841950	Solar collector and solar system controller, heat exchanger	5	3	0/4.2*
841989	Machinery, plant or laboratory equipment whether or not electrically heated (excluding furnaces, ovens etc.) for treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, distilling, rectifying, sterilizing, steaming, drying, evaporating, vaporizing, condensing or cooling.	6	3	0/4.2*
841990	Medical, surgical or laboratory stabilizers	6	2	-0-
848340	Gears and gearing and other speed changers (specifically for wind turbines)	8	3	-0-
848360	Clutches and universal joints (specifically For wind turbines)	9	3	2.8
850161	AC generators not exceeding 75 kVA (specifically for all electricity generating renewable energy plants)	7	3	2.5
850162	AC generators exceeding 75 kVA but not 375 kVA (specifically for all electricity generating renewable energy plants)	7	3	2.5
850163	AC generators not exceeding 375 kVA but not 750 kVA (specifically for all electricity generating renewable energy plants)	5	3	2.5
850164	AC generators exceeding 750 kVA (specifically for all electricity generating renewable energy plants)	5	3	2.4
850231	Electric generating sets and rotary converters; wind-powered	5	3	2.5
850680	Fuel cells use hydrogen or hydrogen-containing fuels such as methane to produce an electric current, through an electrochemical process rather than combustion.	18	3	2.7
850720	Other lead acid accumulators	16	5	3.5
853710	Photovoltaic system controller	10	3	2.7
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	4	1	-0-
900190	Mirrors of other than glass (specifically for solar concentrator systems)	7	3	2.0
900290	Mirrors of glass (specifically for solar concentrator systems)	12	3	2.8
903210	Thermostats	7	3	1.7
903220	Manostats	6	2	1.7

* Some 6-digit product categories are subdivided into 8-digit categories with variable tariff rates. The entries reflect the lowest and highest rates for the 8-digit categories within the 6-digit category.

Sources: World Bank (2008: Appendix 6) for HS Codes, Product Descriptions and Average Tariff Rates; U.S. rates were added by the author from "Harmonized Tariff Schedule of the United States, 2007 (Rev. 2) accessed at www.usitc.gov on October 23, 2007.

3.2 Biofuels and Related Goods⁸

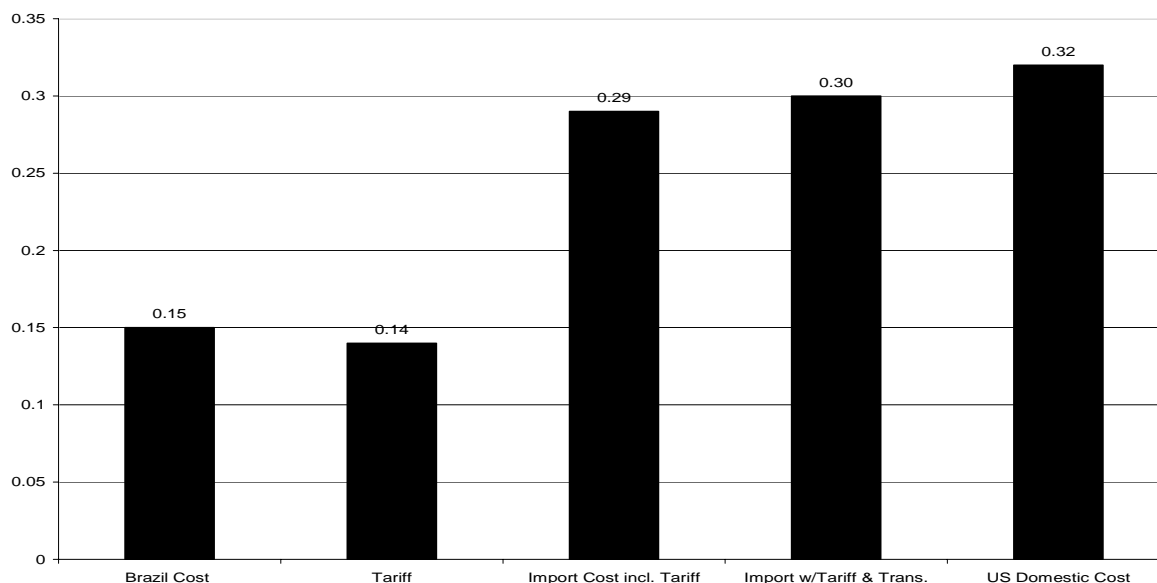
The tariff data in Table 2 pertain only to industrial goods, and of course industrial goods tariffs in general tend to be relatively low in industrialized countries. Their tariffs on agricultural goods, on the other hand, are of course not so low. Tariff rates in the biofuels industries, in particular, have been receiving special scrutiny in the context of climate change policymaking.⁹

⁸ This section is based in part on Brewer (2007b).

⁹ Many - *though not all* - ethanol and biodiesel fuels are cost-effective ways to reduce greenhouse gas emissions. There are important exceptions, depending for instance on the type of feedstock and land use changes involved in changing to biofuel feedstock production. Further, there are not only significant differences in the cost-effectiveness among the specific types of fuels depending on the feedstock used, there are also significant differences in countries'

The current tariff rate for imported ethanol is 14.27 cents per litre.¹⁰ Compared with the current production-plus-transportation costs for Brazilian ethanol exports to the U.S. of approximately 15 cents per litre, the effective U.S. tariff rate of 54 cents per gallon is in fact equivalent to an *ad valorem* rate of approximately 100 percent. See Figure 1.¹¹

Figure 1. Effects of U.S. Tariff on Brazilian Imports of Ethanol (U.S. cents per litre)



N.B. These data were compiled before the price increases during 2006-2007 in the corn-based feedstock in the U.S. and sugar case-based feedstock in Brazil.

Source: Compiled by the author from data in Paustian (2006) for Brazil, Fulton et al. (2004), and US ITC (2004 and 2006)

Of the many countries that have tariffs on imports of biofuel *feedstocks*, the U.S. has a relatively high rate of 19.1 percent on soybean oil, which is the principal feedstock used to make biodiesel fuel in the U.S. (Kerr and Loppacher, 2005: 57; UK, Department of Transportation, c.2003: 37).

There are of course many industrial goods that are involved in the production of biofuels. For instance, there are small, complete refineries, which are classified as HS 8479.20 (“oil extraction

comparative cost advantages in producing them. As a result, how and where biofuels are produced are important determinants of the extent to which they can contribute to climate change mitigation, or in some instances even be counter-productive in that regard. In short, the production technologies and the country locations of production matter. Detailed life cycle analyses are thus needed for the specific types and production circumstances to determine GHG-mitigation potentials.

¹⁰ In the HS Code, *biodiesel* is classified as an *industrial* product (while bioethanol is classified as an agricultural product.) Nearly 40 countries have bound rates on *biodiesel* greater than 20 percent. Among them, India is the highest at 30 percent (Steenblik (2006: 8, 26). The EU tariff is 5.1 percent and the U.S. 4.6 percent.

¹¹ Production costs of ethanol in the U.S. have subsequently increased substantially because of rapid increases in the price of corn, the principal feedstock for ethanol in the U.S. Sugar cane prices in Brazil have also risen, but not as much. Transportation costs are relatively low – less than 2 or 3 US cents per litre for ocean transport (IEA, 2005: 140).

machinery”). Oilseed crushing machines are classified as HS 8479.82. As Table 3 indicates, the U.S. is one of the countries in the world with the highest tariffs on these two types of machines.

Table 3. Countries with High Applied Tariff Rates on Oil Extraction Machines and Oilseed Crushing Machines

	Oil Extraction Machines (HS 8479.20)	Oilseed Crushing Machines (HS 8479.82)
China	30%	30%
India	25%	25%
United States	35%	35%

Source: Steenblik (2006: Annex Table 2, p. 25)

A U.S. government subsidy program what was intended to encourage domestic biodiesel production for domestic consumption turned out to have a loophole that was exploited by one or more biofuels firms as a way to collect subsidies based on a “splash and dash” scheme as it came to be called (Kram, 2007). The program provides for a 1 cent production subsidy per percentage point of biodiesel added to a blend with petro-diesel. One or more U.S.-based firms used the subsidy by importing biodiesel, blending it to create a 99.9 percent biodiesel blend, thereby collecting 99.9 cents on each gallon of blended fuel, and exporting the blend to Europe, where it also received a subsidy. The practice became a source of trans-Atlantic trade friction, when the European biodiesel industry objected. By November 2007, there were efforts under way in the Congress to end the practice, with one bill proposing to make the rescission retroactive so that firms would have to pay back the subsidies they had collected, while the other simply ended the practice.

4. Programs that Promote Exports, Foreign Direct Investments and Technology Transfers

The U.S. government, of course, has many programs that promote exports - not only in the agricultural sector but also in manufacturing. The interest in promoting exports is apparent in the “Climate Change” title of the Energy Policy Act of 2005, where the emphasis is on market access for U.S. exports and intellectual property rights protection for U.S. firms.¹² That title of the act specifically requires the Office of the U.S. Trade Representative (USTR) to: (1) identify developing countries’ barriers to U.S. exports of greenhouse gas reducing technologies, (2) negotiate their removal, and (3) report to Congress annually on progress in achieving their

¹² The U.S. Energy Policy Act of 2005 is also known as the Domenici-Barton Energy Policy Act, after the members who chaired the energy committees, respectively, of the Senate and House of Representatives and who were the leaders of the legislative processes in their chambers. The entire act is 550 pages long (in the printed version) and includes 18 titles; the “Climate Change” title is XVI. The other titles of the act with provisions concerning climate change cognate issues include: Energy Efficiency (I), Renewable Energy (II), Oil and Gas (III), Coal (IV), Vehicles and Fuels (VII), Hydrogen (VIII), and Energy Policy Tax Incentives (XIII). The text of the entire act is available at <http://frwebgate.access.gpo.gov> or <http://thomas.loc.gov/cgi-bin/query/D?c109:37:./temp/~c109X7YfVj>. Title XVI is commonly known as the Hagel-Pryor Amendment, after the senators who introduced it. The amendment was based on two bills (S. 883 and S. 887) that had previously been submitted by Senator Hagel but not passed. The Hagel-Pryor amendment passed the Senate by a vote of 66-29 and thus received the most support of any of the climate change amendments offered in the Senate during the deliberations on the Energy Policy Act during the summer of 2005 (see U.S. Congressional Research Service, 2005).

removal. The negotiations could occur within the context of bilateral, regional and multilateral international trade agreements; they could involve investment and intellectual property issues, as well as trade issues; and they could cover international business transactions in the services, manufacturing and agricultural sectors. This mandate for the USTR and other executive agencies therefore expands the international climate change agenda for both business and government along numerous dimensions.

As for export promotion, the title requires an inter-agency working group to implement a Greenhouse Gas Intensity Reducing Technology Export Initiative to review the performance of U.S. government agencies in promoting such technologies. It also provides for the development of demonstration projects in developing countries and other forms of assistance (though without any funding levels specified). These export promotion activities also expand the climate change agenda for U.S. business as well as government agencies.

These expansions of the climate change agenda extend to Congress because additional committees in both the House of Representatives and the Senate will become more involved in key aspects of climate change issues. Subtitle A, which revises the Energy Policy Act of 1992, is focused on “greenhouse gas intensity reducing strategies,” as are all the other sections of the title. It establishes organizational arrangements in the executive branch.¹³

Subtitle B revises the Global Environmental Protection Assistance Act of 1989 by adding two sections. There are two closely related, complementary emphases: the reduction of “trade-related barriers to export of greenhouse gas intensity-reducing technologies” in developing countries (section 734) and the promotion of U.S. exports through a “greenhouse gas intensity reducing technology export initiative” (section 735).

The key language of Section 734 follows: “Not later than 1 year after the date of enactment of this part [in July 2005], the United States Trade Representative shall (as appropriate and consistent with applicable bilateral, regional and mutual [*sic*] trade agreements) ...identify trade-relations barriers maintained by foreign countries to the export of greenhouse gas intensity reducing technologies and practices from the United States to the developing countries identified [as the 25 that are the largest greenhouse gases emitters]; and ... negotiate with foreign countries for the removal of these barriers”. Further, the United States Trade Representative must annually

¹³ The organizational arrangements include a Committee on Climate Change Technology, chaired by the Department of Energy, with representatives from the Council on Environmental Quality and Office of Science and Technology Policy in the Executive Office of the President, the Environmental Protection Agency, and the departments of Agriculture, Commerce, and Transportation (and a provision for the possibility of adding others in the future). Key industries are given direct access to the advisory process through the creation of the Climate Change Technology Advisory Committee consisting of the following: energy producing trade organizations – 3 members; energy-intensive trade organizations – 3 members; energy end-use and other consumer organizations – 3 members; federal government experts in energy technology, intellectual property and tax – 3 members; higher education experts in energy technology, recommended by National Academy of Engineering – 3 members; federal government national laboratories – 1 each from Department of Energy National Laboratories. Subtitle A also provides for the development of a domestic inventory of technologies and the creation of demonstration projects. Although it “authorizes” future expenditures, it does not indicate any dollar amounts; in any case, specific future actions by the Congress and the executive branch in subsequent budget cycle appropriations processes are required in order for the various provisions to be funded – as is normal practice.

submit to Congress “a report that describes any progress made with respect to removing the barriers....”

Title XVI has extensive reporting requirements, including in particular reports to Congress. There are two required reports of inventories – one of technologies developed in the United States and the other of technologies that are “suitable” for transfer to developing countries (the latter presumably being a subset of the former). There are also reports of barriers – one of barriers in the United States to the commercialization and deployment of technologies, another of foreign countries’ barriers to the export of technologies from the United States. These and other reports are, for the most part, required to be submitted to the Congress generally, or specific committees of the Congress, as well as the public. Most must be submitted annually after the initial report. (See Annex III for additional details of the reporting requirements.)

The trade negotiations mandated by Title XVI were already within the purview of the USTR. Further, some of the issues concerning the interactions of the international climate change regime embedded in the Kyoto Protocol and the international trade regime embedded in the WTO have already received some attention within the context of the work program of the WTO Committee on Trade and Environment (WTO, 1998, 2001). In addition to the WTO, the negotiations mandated by Title XVI could occur in the context of a broad array of international trade agreements to which the U.S. is already a party (see Brewer, 1999, and Brewer and Young, 2000). These trade agreements are of course the result of decades of negotiations with virtually all countries in the world, and they have been conducted independently of the separate negotiations on multilateral, regional and bi-lateral climate change agreements.

The significance of Title XVI, therefore, does *not* concern the trade negotiating authority of the U.S. government. Rather, the significance of Title XVI is that it expands the climate change agenda in the U.S. by linking it explicitly to trade issues and by requiring that issues concerning technology transfers to developing countries be framed at least in part as trade issues.¹⁴

5. Bilateral and Regional Technology Cooperation Agreements

Beginning in the early 1980s, there was a significant shift in U.S. trade policy towards more emphasis on the negotiation of bilateral and regional agreements - and less commitment to the multilateralism in trade policy that had been a hallmark of U.S. trade policy since the creation the General Agreement on Tariffs in Trade (GATT) in the 1940s after World War II. This shift in emphasis was first apparent in the Reagan administration but has continued in varying degree in both Democratic and Republican administrations since the early 1980s. The tendency became

¹⁴ FDI policies are also relevant. For instance, the U.S.-based firm, Cargill, is investing in an ethanol production plant in Jamaica to use imported Brazilian sugar cane feedstock and then export the ethanol to the U.S. free of the U.S. tariff because Jamaica is a Caribbean Basin Initiative country (according to U.S. law). Although the use of FDI by multinational firms as a strategic alternative to circumvent trade barriers is, of course, a common phenomenon, it has attracted the interest of members of the U.S. Congress because the project was undertaken with the support of U.S. government subsidies for outward FDI under the auspices of the U.S. Overseas Private Investment Corporation (OPIC) – a government entity that provides loan guarantees and political risk insurance for outward FDI by U.S.-based corporations in ‘developing’ countries.

especially pronounced in the Bush II administration, beginning in 2001, as part of a broader retreat from multilateralism in U.S. diplomacy.¹⁵

As a result of this tendency toward increased bilateralism and regionalism in its trade policy, by 2007 the U.S. was involved in 14 Bilateral Free Trade Agreements, 39 Bilateral Investment Treaties, 27 Bilateral Trade and Investment Framework Agreements, and 5 Regional Agreements that were either in effect or under negotiation (USTR, 2007a). Altogether, there were 85 such agreements.¹⁶

The bilateralism was manifest, for instance, in the U.S.-Brazil bilateral biofuels agreement announced in March 2007 (U.S., White House, 2007). More generally, international climate change technology cooperation agreements have nearly all been only bi-lateral or regional in scope (see Table 4).

This proliferation of bilateral and regional agreements can be attributed in substantial part to two factors - one concerning international negotiations and the other domestic politics. First, such agreements enable the U.S. to be in a stronger negotiating position, as compared with multilateral forums. Second, because they can be counted and can be accumulated over time to produce more and more, they create a tangible record of activity, which can in turn be used to indicate commitment and progress in addressing an issue.¹⁷

Table 4. Partial List of U.S. Government Climate Change Programs with International Technology Transfer Elements

Agreement (date)/ web site	Number of Countries	Mission/activities
Carbon Sequestration Leadership Forum (2003) www.fe.doe.gov/programs/sequestration/csLf	21	Members are dedicated to collaboration and information sharing in developing, proving safe, demonstrating and fostering the worldwide deployment of multiple technologies for the capture and long-term geologic storage of carbon dioxide at low costs; and to establishing a companion foundation of legislative, regulatory, administrative, and institutional practices that will ensure safe, verifiable storage for as long as millennia.
International Partnership for the Hydrogen Economy (2003)	17	The IPHE provides a mechanism for partners to organize, coordinate and implement effective,

¹⁵ The current U.S. (“Bush II”) administration has sometimes obscured the traditional distinctions by using the term “multilateral” to refer to what have traditionally been considered regional agreements. For instance, the Asia Pacific Partnership (APP) is sometimes referred to as a “multilateral” agreement, even though it includes only a small number of participants from one region. Within the multilateral WTO, there are “plurilateral” agreements that include only subsets of WTO members. One such agreement is the Agreement on Government Procurement, which directly affects trade in some goods related to climate change mitigation. See especially Van Asselt, van der Grijp and Oosterhuis (c. 2005).

¹⁶ Although the U.S. has been particularly active in negotiating bilateral and regional agreements, it has not been the only country to do so. The number of such agreements “notified” to the WTO by its members totaled nearly 300 by early 2000 (WTO, 2007).

¹⁷ The use of such quantitative indicators of accomplishment has been especially notable in recent years in reports on both international trade policymaking and international climate policymaking, including by the Office of the U.S. Trade Representative, Department of State and the White House.

www.iphe.net		efficient, and focused international research, development, demonstration and commercial utilization activities related to hydrogen and fuel cell technologies.
Methane to Markets (2004) www.methandetomarkets.org	22	Advances cost-effective, near-term methane recovery and use as a clean energy source
International Energy Agency (1974) www.iea.org	26	To encourage collaborative efforts to meet these energy challenges [including climate change], the IEA created a legal contract – Implementing Agreement – and a system of standard rules and regulations. This allows interested member and non-member governments or other organisations to pool resources and to foster the research, development and deployment of particular technologies.
Asia Pacific Partnership (2005) www.asiapacificpartnership.org	7	...work together and with private sector partners to meet goals for energy security, national air pollution reduction, and climate change in ways that promote sustainable economic growth and poverty reduction. The Partnership will focus on expanding investment and trade in cleaner energy technologies, goods and services in key market sectors.
Energy Star agreements (various years) www.energystar.gov	7 bilaterals	Agreements to promote certain ENERGY STAR qualified products were established with government agencies in various countries. These partnerships are intended to unify voluntary energy-efficiency labeling programs in major global markets and make it easier for partners to participate by providing a single set of energy-efficiency qualifications, instead of a patchwork of varying country-specific requirements.
ITER (1985) www.iter.org [Originally ITER was an acronym for International Thermonuclear Energy Reactor, but it is now interpreted as representing “The Way” as in Latin.]	7	The programmatic goal of ITER is "to demonstrate the scientific and technological feasibility of <i>fusion</i> power for peaceful purposes". Compared with current conceptual designs for future fusion power plants, ITER will include most of the necessary technology, but will be of slightly smaller dimensions and will operate at about one-sixth of the power output level.

N.B. This is a partial list. For a more nearly complete list, see www.usctcgateway.gov/usctc/programs/
Source: Compiled by the author from the web sites identified in the first column, accessed on 27 November 2007

Programs listed in Table 4 offer much variety not only in their memberships and technologies, but also in the extent and significance of their activities. Some such as the ITER have been in existence for many years and involve large, long-term tangible projects - now fusion research in that particular case. Others such as APP are relatively new and thus far have been mostly devoted to forming committees and other working groups. The levels of funding have also not necessarily reflected the scope of the objectives in all instances. The Congress has balked, for instance, in funding the APP at levels requested by the administration because of concerns about the seriousness of the intentions that led to its creation. In any case, despite whatever variations and uncertainties there may be in their particular activities, they provide a kind of institutional infrastructure that could be used to develop and fund a wide variety of international technology transfer activities in the future, particularly with administration and congressional support.

Collectively, therefore, these arrangements could lead to significant international trade in technology, especially in some key technologies such as carbon sequestration, nuclear energy and energy efficiency.

6. International Disputes

The first international trade-climate dispute has arguably already begun, at least informally - namely the U.S. government's objections to the EU plan to cover aviation in its Emissions Trading Scheme. It is important to note that this is not a formal dispute brought within the context of the WTO dispute settlement process. Rather, the basis of the U.S. objection is the Chicago Convention on Civil Aviation of 1944, which established the system of bi-lateral agreements that regulate airline services and which is administered by the International Civil Aviation Organization (ICAO). At issue, in part, is Article 15 which includes the following provision: "No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon" (Chicago Convention, 1944). Whereas the European Commission has asserted that its proposal does not violate this or any other provision of the Convention, the U.S. government has indicated that it intends to take the matter to the International Court of Justice. While the Office of the U.S. Trade Representative has not made a formal public statement on the issue, the U.S. Federal Aviation Administration and the U.S. Ambassador to the EU have both been vocal about the issue. An unnamed U.S. government representative said the EU had decided to go ahead with the plan "despite strong objections raised by the US" (Financial Times, 2006d).

A statement by the U.S. Ambassador to the EU, Boyden Gray, in September 2007, was particularly direct: "We don't think Europe has the authority to do it....The Europeans are confident of their legal authority and people on the other side are equally confident of their position. It sounds like a lawsuit to me. I don't see how it's going to get resolved politically" (International Herald Tribune, 2007).

Whether it can be resolved politically remains to be seen. Importantly, the application of the EU's Emission Trading Scheme to the aviation industry would not come into force until 2010 or 2011, with international flights into and out of the EU possibly not included until a year after the initiation of the system for flights within the EU. This would mean transatlantic flights affecting the U.S. would not be included until 2011 or 2012, long after a new U.S. administration will be in office. (For more on the case, see Council on Foreign Relations, 2007; Eurarchiv, 2007; Financial Times, 2006a, 2006b, 2006, 2006d, 2007a, 2007b; U.S. Mission to the EU, 2007).

7. Conclusions

The discussion in the previous sections of the paper makes clear that climate change issues and international trade-investment-technology transfer issues have intersected in the U.S. policymaking process in the Congress as well as executive agencies.

Climate-trade intersections will be addressed in a variety of international climate and trade venues, including bilateral and regional arrangements, as well as multilateral arrangements. The

U.S.- EU dispute over including aviation in the EU ETS is evidence that neither the FCCC nor the WTO - nor even the two of them together - have exclusive claims as international venues for addressing climate-trade issues. As such issues become more tangible and the stakes become greater for firms and industries, other industry-specific international agreements may become involved in climate-trade issues, including for instance international shipping.

In any case, the agenda of the WTO will surely be expanded in coming years, as a variety of international trade-investment-technology initiatives driven by climate change concerns are suggested. The several prefatory quotes at the beginning of the paper have already signaled a change in the WTO agenda - at least informally. Further, the World Bank study (2008) of climate and trade issues has suggested specifically that an approach to the liberalization of trade in climate friendly goods and services might be effectively modeled on the Information Technology Agreement at the WTO. Yet another implication for the WTO agenda is that linkages between goods and services, and between industrial and agricultural issues will need to be addressed more explicitly and systematically - a need that has emerged in regard to bioethanol tariffs (which are classified as agricultural goods in the Harmonized System) and biodiesel fuels (which are classified as industrial goods).

Furthermore, the hundreds of existing bilateral and regional trade and investment agreements are likely to come under scrutiny for provisions concerning climate-friendly goods and services, with the objective of determining whether any of them are inhibiting trade, investment and technology transfers that could mitigate greenhouse gas emissions.

An implication for international climate negotiations is that the U.S. may advocate the inclusion of import border measures to address free rider problems in the post-2012 multilateral climate change regime. In such a circumstance, there could be a further irony - namely that the U.S. and EU might jointly advocate such a provision. For the EU, as indicated in section 2 of the paper, the European Parliament has adopted a resolution that the EU should adopt such measures against the U.S. because of its non-participation in the Kyoto Protocol. Thus, there is already evidence of political support for offsetting import measures directed against free riders. Although European sentiment toward free riders other than the U.S. may not be nearly so strong as it is against the U.S., there could be an expansion and redirection of the previous discussion - if the U.S. adopts a significant mandatory cap-and-trade system in the next few years.

On these and other issues, because the tendencies in U.S. international trade-investment-technology transfer policies are deeply embedded in the institutional and attitudinal contexts in which specific policy issues are considered, they will directly affect U.S. government positions in negotiations about the post-2012 international climate regime. Though the particular manifestations of these tendencies will vary according to the composition of the Congress as well as the identity of the President, the basic tendencies are likely to be evident no matter what the outcomes of the next several Congressional and Presidential elections. Realistic expectations about the roles and policy positions of the U.S. government in international climate regime negotiations will need to take these tendencies into account.

Wide-ranging as it is, the U.S. agenda thus far does not include two additional sets of issues that are on the agendas of other countries. One concerns trade, investment and technology transfer

issues associated with the Clean Development Mechanism (CDM) projects of the FCCC/Kyoto Protocol; these issues have not been on the U.S. government agenda because of its non-participation in the Kyoto Protocol. However, it can be briefly noted that a recent study conducted by the UNEP Risö Center in Denmark for the OECD (2007: 6) found that the actions that could “help to reduce barriers [to CDM projects] include reducing participation/ownership restrictions on foreign investment and ownership in sectors liable to CDM investments.” The other issue not yet on the U.S. agenda concerns product labeling for the specification of the greenhouse gas footprints of products in international trade - an issue which is being studied by the World Bank and by the EU in regard to biofuel imports. Both the CDM and product labeling issues are likely to enter on the U.S. agenda within a few years.

The strong interdependencies among trade, investment and technology transfer are often only evident at the firm level and project level. Large multinational firms, in particular, often “bundle” complex packages of trade in goods and services, licensing, loans and other international transactions in conjunction with their foreign direct investment projects involving foreign wholly-owned subsidiaries, international joint ventures or other projects. Such bundling may therefore be important in some CDM projects. As the analysis of climate-trade intersections moves forward, therefore, it will be important to conduct research and policy analysis at all of the following levels of analysis: countries, industries, firms, products and projects.

Annex I Climate Change-International Trade Legislation Pending in U.S. Congress

Table I.1 Comparisons of International Trade, Investment and Technology Transfer Provisions in Climate Change Bills and Energy Bills Pending in the U.S. Congress, November 2007

Bill Numbers, Sponsors, Names	Restrictions on Imports into U.S. from “Free Rider” Countries	U.S. Export Promotion and Business Opportuni- ties	Financial Assistance for Developing Countries, including Credits for Offsets	Limits on Use of International Emissions Credits	Other
Senate					
S.280, McCain-Lieberman, Climate Stewardship and Innovation Act		Sec. 311	Sec. 145		
S.309, Sanders-Boxer, Global Warming Pollution Reduction Act			Sec. 716		
S.317, Feinstein-Carper, Electric Utility Cap and Trade Act					Sec. 719
S.485, Kerry-Snowe, Global Warming Reduction Act				Sec. 301	
S.1168, Alexander-Lieberman Clean Air Climate Change Act					
S.1177, Carper, Clean Air Planning Act					
S.1201, Sanders, Clean Power Act					
S.1766, Bingaman-Specter, Low Carbon Economy Act	Secs. 501-502				
S. 2191, Lieberman-Warner, America’s Climate Security Act	Secs. 6001- 6007			Secs. 2501-2503	Secs. 3801- 3806

House					
H.R.620, Olver-Gilcrest, Climate Stewardship Act [similar to S.280, not identical]			Sec. 145		
H.R.1590, Waxman, Safe Climate Act					

Summaries of provisions:

McCain-Lieberman, S.280

Sec. 145 establishes a program “to assist developing countries in achieving sustainable development and in contributing to the objective of reducing” GHG emissions, which program would include “tradeable allowances from project activities in developing countries resulting in certified emission reductions.” [same as H.R. 620]

Sec. 311 requires Secretary of Commerce to conduct an annual “analysis of business opportunities, both domestically and internationally, available for climate change technologies” and report the “findings and recommendations to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Science.”

Sanders-Boxer, S.309

Sec. 716 requires the executive branch to: establish a “Task Force on International Clean, Low-Carbon Energy Cooperation,” develop a “strategy” to “promote the adoption of clean, low-carbon energy technologies and energy-efficiency technologies” in developing countries, “open and expand clean, low-carbon energy technology markets” and “facilitate the export of that technology” from the U.S. to developing countries.

Feinstein-Carper, S. 317

Sec. 719 limits use of international credits.

Kerry-Snowe, S.485

Sec. 301 on “International Negotiations and Trade Restrictions” is a “Sense of the Senate” resolution that the U.S. should “foster sustained economic growth through a new generation of technologies” by participating in the UNFCCC negotiations and by “leading efforts in other international forums, with the objective of securing participation of the United States in agreements that... advance and protect the economic ... interests of the United States...”

Bingaman-Specter, S.1766

Secs.501-502 require periodic reviews of “whether each of the 5 largest trading partners” of the U.S. has taken “comparable action” as the U.S. to limit GHG emissions, “taking into account the level of economic development of the foreign country.” U.S. importers of “covered” GHG-intensive goods from countries that have been found not to have taken comparable actions must purchase “international reserve allowances” issued by the U.S. government. *N.B.* There are numerous provisions concerning definitions, reporting requirements, negotiations, exceptions and other aspects of this proposal. These are analyzed in a separate side-by-side comparative chart in “Border Measures on Imports to Address International Competitiveness and Free Rider Issues, as Contained in Pending U.S. Senate Climate Bills.”

Lieberman-Warner, S. 2191

Title VI, “Global Effort to Reduce Greenhouse Gas Emissions,” (Sections 6001-6007) would establish a requirement that U.S. importers of covered goods from covered countries purchase “international reserve allowances.” In that core provision and in many of its details, it is quite similar to S. 1766 (see above). *N.B.* There are numerous provisions concerning definitions, reporting requirements, negotiations, exceptions and other aspects

of this proposal. These are analyzed in a separate side-by-side comparative chart in “Border Measures on Imports to Address International Competitiveness and Free Rider Issues, as Contained in Pending U.S. Senate Climate Bills.”

In Title II, “Managing and Containing Costs Efficiently,” Secs. 2501-2503 limit the use, for any one covered facility in the U.S., of credits obtained from *foreign* GHG emissions trading markets to 15 percent of the total allowances required by the *domestic* allowance program. Note that this is *not* part of the “international reserve allowances” program noted in the paragraph above concerning Title VI.

In Title III, “Allocating and Distributing Allowances,” Subtitle H - International Forest Protection, Secs. 3801-3806, provides that 3 percent of the annual allocation from the Emission Allowance Account would be for “forest carbon activities” in *foreign* countries.

Olver-Gilcrest, H.R. 620

Sec. 145 establishes a program “to assist developing countries in achieving sustainable development and in contributing to the objective of reducing” GHG emissions, which program would include “tradeable allowances from project activities in developing countries resulting in certified emission reductions.” [same as S.280]

Waxman, H.R. 1590

No international provisions.

Source: Compiled by the author from texts of the bills at the Library of Congress, www.loc.thomas.gov, accessed on 20 October 2007.

Table I.2 International Trade, Investment and Technology Transfer Provisions Concerning Climate Change in the *Energy Bills* Pending in the U.S. Congress, October 2007

Bills	International Competitiveness Issues are Addressed	U.S. Export Promotion and Business Opportunities	Financial or Other Assistance for Developing Countries	Other Topics	International Trade, Investment, or Technology Transfer Issues are Implicit
House: H.R. 3221	Sections 2102 2208	Sections 2202 2203 2204 2205 2206 2208	Sections 2202 2203 2204 2205 2206	Section 2207	Most titles, including Title IV, Science and Technology
House: H.R. 2776 (tax bill)					Sec. 401 Sec. 402
Senate: S. 1419		Section 706	Section 706	Section 302	

Summaries of provisions:

H.R. 3221

Title II, “International Climate Cooperation Re-Engagement Act of 2007,” in addition to several definitions, contains three subtitles concerning climate change and closely-related energy issues.

Sec. 2002 defines “clean and efficient energy technology” to be “energy supply or end-use technology ... (B) that, over its life cycle and compared to similar technology already in commercial use... (ii) results in -- reduced emissions of greenhouse gases; or”

Although the bill “authorizes” expenditures for numerous initiatives, as summarized below, it does *not* “appropriate” any funds (which would have to be done in subsequent appropriation bills).

Subtitle A, “United States Policy on Global Climate Change,” states Congressional findings in Sec. 2101 and Congressional policy in Sec. 2102, and establishes an Office on Global Climate Change in the Department of States in Sec. 2103. The only provisions concerning international trade, investment and technology transfer are rather general ones in Sec. 2102 in which “Congress declares the following to be the policy of the United States... (5) To

protect ... United States [international] competitiveness in all sectors by negotiating a new agreement under the [UN Framework] Convention [on Climate Change]...[which will]...(C) increase [international] cooperation on clean and efficient energy technologies and practices...(H) consider the impact on United States industry and contain effective mechanisms to protect United States competitiveness....”

Subtitle B, “Assistance to Promote Clean and Efficient Energy Technologies in Foreign Countries,” includes extensive and detailed provisions:

Sec. 2201: Congress “finds” that ... “(5) In addition to promoting the export of clean energy technologies, large energy-consuming economies must also have appropriate incentive systems, policy and regulatory frameworks, and investment [incentives] in place to accept and promote the adoption of such technologies...”

Sec. 2202: The US Agency for International Development “shall support policies and programs in developing countries that promote clean and efficient energy technologies ...to promote the use of American-made clean and efficient energy technologies [see definition above in sec. 2002]...”

Sec. 2203: The Commerce Department “shall” ... “expand or create a corps of the Foreign Commercial Service officers to promote United States exports in clean and efficient energy technologies [see definition above in sec. 2002] and build the capacity of government officials in India, China [and other countries]... to become more familiar with the available technologies...for the purposes of promoting United States exports and reducing global greenhouse gas emissions.”

Sec. 2204: The International Trade Administration in the Commerce Department shall “expand or create trade missions to and from the United States to encourage private sector trade and investment in clean and efficient energy technologies [see definition above in sec. 2002]....”

Sec. 2205: The US Overseas Private Investment Corporation (OPIC) ‘should promote greater investment in clean and efficient energy technologies [see definition above in sec. 2002]”

Sec. 2206: The US Trade and Development Agency “shall establish or support policies that” promote the adoption of clean and efficient energy technologies in foreign countries, particularly “countries that have the potential for significant reduction in greenhouse gas reductions...”

Sec. 2207: The State Department is authorized to establish a Global Climate Exchange Program, for the “financing of studies, research, instruction and other educational activities dedicated to reducing carbon emissions and addressing the challenge of global climate change” by foreigners in US institutions or Americans in foreign institutions.

Sec. 2208: A Clean Energy Technology Exports Initiative “shall” be supported by the President ...(1) to improve the ability of the United States to respond to international competition ... by raising policy issues that may hamper the export of United States clean energy technologies....”

Subtitle C, “International Clean Energy Foundation,” establishes a government corporation that will use its funds “to make grants to promote projects” in foreign countries to “serve as models of how to significantly reduce” GHG emissions “through clean and efficient energy technologies....”

Title IV, “Science and Technology,” contains numerous provisions concerning renewable energy and other climate change-related energy issues, and in Subtitle G, “Global Change Research” (which may also be cited as the “Global Change Research and Data Management Act of 2007”). Although many provisions implicitly or indirectly pertain to international trade, investment and technology transfer issues, none does so explicitly.

Other provisions of the bill - which is 786 pages long - contain references to energy issues which implicitly or indirectly related to international trade, investment and technology transfer issues associated with climate change.

H.R. 2776 (tax bill)

Title IV, “Other Provisions,” includes two sections with potential international trade, investment, technology transfer implications. The *Internal Revenue Code*, despite its name, actually contains provisions concerning *international* tax issues, such as the treatment of the foreign source income of multinational corporations.

Sec. 401, “Carbon Audit of the Tax Code,” calls for a National Academy of Sciences “comprehensive review” of the Internal Revenue Code “to identify the types and specific tax provisions that have the largest effects on carbon and other greenhouse gas emissions and to estimate the magnitude of those effects.”

Sec. 402, “Comprehensive Study of Biofuels,” calls for the Treasury, Agriculture and Energy Departments, and the Environmental Protection Agency, to agree with the National Academy of Sciences to do an analysis of “current scientific findings” that includes “a comparative analysis of corn ethanol versus other biofuels and renewable energy sources, considering cost, energy output, and ease of implementation...”

S. 1419

Title III, Sec. 302: At least one of seven initial large-volume tests of geologic containment of carbon dioxide must be “international in scope”

Title VII, Sec. 706: A newly-created [Western] Hemisphere Energy Cooperation Forum of government and industry representatives should undertake an Energy Sustainability Initiative that would “(i) promote production and trade in sustainable energy, including energy from biomass, (ii) facilitate investment, trade and technology cooperation in ...energy efficiency...clean fossil energy, renewable energy, and carbon sequestration...” and also undertake an Energy for Development Initiative “to promote energy access for underdeveloped areas ...including activities that ... (v) promote development and deployment of technology for clean and sustainable energy development, including biofuel and clean coal technologies; and (vi) facilitate use of carbon sequestration methods in agriculture and forestry and linking greenhouse gas emissions reduction programs to international carbon markets.”

Source: Compiled by the author from texts of the bills at the Library of Congress, www.loc.thomas.gov, accessed on 1 September 2007.

Annex II. Comparisons of World Bank and USTR Lists of Climate Change Relevant Goods

HS Code	Product Description	List(s) in which Product Appears		
		Both	World Bank Only	USTR Only
39	Plastics and articles thereof	1	0	3
391721	Tubes, pipes & hoses, rigid of polymers of ethylene (specifically piping for methane gas removal/reuse, leachate collection, etc. from landfills)			x
391722	Tubes, pipes & hoses, rigid of polymers of polymers of propylene (specifically piping for methane gas removal/reuse, leachate collection, etc. from landfills)			x
301723	Tubes, pipes & hoses, rigid of polymers of vinyl chloride (specifically piping for methane gas removal/reuse, leachate collection, etc. from landfills)			x
392010	PVC or polyethylene plastic membrane systems to provide an impermeable base for landfill sites and protect soil under gas stations, oil refineries, etc. from infiltration by pollutants and for reinforcement of soil.	x		
56	Wadding, felt and nonwovens; special yarns, twine, cordage, ropes and cables and articles thereof	0	1	0
560314	Non-wovens, whether or not impregnated, coated, covered or laminated: of manmade filaments; weighing more than 150 g/m ² for filtering wastewater.)		x	
70	Glass and glassware	0	1	0
701931	Thin sheets (voiles), webs, mats, mattresses, boards and similar nonwoven products		x	
73	Articles of iron or steel	2	3	0
730820	Towers and lattice masts for wind turbine	x		
730900	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.	x		
732111	Solar driven stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel.		x	
732190	Stoves, ranges, grates, cookers (including those with subsidiary boilers for central heating), barbecues, braziers, gas-rings, plate warmers and similar non-electric domestic appliances, and parts thereof, of iron or steel. - Parts.		x	
732490	Water saving shower.		x	
76	Aluminum and articles thereof	1	1	0
761100	Aluminium reservoirs, tanks, vats and similar containers for any material (specifically tanks or vats for anaerobic digesters for biomass gasification)	x		
761290	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.		x	
84	Reactors [nuclear], boilers, machinery and mechanical appliances; parts thereof	15	5	15
840211	Watertube boilers steam production exceeding 45 tons per hour			x
840212	Watertube boilers steam production not exceeding 45 tons per hour			x

840219	Vapor generating boilers, not elsewhere specified or included hybrid	x		
840220	Super-heated water boilers			x
840290	Super-heated water boilers and parts of steam generating boilers	x		
840410	Auxiliary plant for steam, water and central boiler	x		
840420	Condensers for steam or other vapor power units			x
840490	Parts for auxiliary plant for boilers, condensers for steam, vapour power unit	x		
840510	Producer gas or water gas generators, with or without purifiers	x		
840681	Turbines, steam and other vapour, over 40 MW, not elsewhere specified or included	x		
840682	Turbines, steam and other vapour, not over 40 MW, not elsewhere specified or included			x
840999	Parts suitable for use solely or principally with the engines of heading no. 8407 or 8408 (specifically industrial mufflers)			x
841011	Hydraulic turbines and water wheels of a power not exceeding 1,000 kW	x		
841012	Hydraulic turbines & water wheels >1,000KW <10,000KW			x
841013	Hydraulic turbines & water wheels >10,000KW			x
841090	Hydraulic turbines and water wheels; parts, including regulators	x		
841181	Gas turbines of a power not exceeding 5,000 kW	x		
841182	Gas turbines of a power exceeding 5,000 kW	x		
841459	Fans, N.E.S.O.I.			x
841480	Air/gas pumps, compressors and fans etc., N.E.S.O.I.			x
841581	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)	x		
841780	Industrial or lab furnaces & ovens, including nonelectric, N.E.S.O.I. (specifically waste incinerators)			x
841790	Parts of industrial or lab furnaces & ovens, including nonelectric, N.E.S.O.I. (specifically waste incinerators)			x
841861	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)		x	
841869	Compression type refrigerating, freezing equipment incorporating a valve for reversal of cooling/heating cycles (reverse heat pumps)		x	
841919	Solar boiler (water heater).	x		
841940	Distilling or rectifying plant		x	
841950	Solar collector and solar system controller, heat exchanger	x		
841960	Machinery for liquefying air or gas			x
841989	Machinery, plant or laboratory equipment whether or not electrically heated (excluding furnaces, ovens etc.) for treatment of materials by a process involving a change of temprature such a heating, cooking, roasting, distilling, rectifying, sterlizing, steaming, drying, evaporating, vaporizing, condensing or cooling.		x	
841990	Medical, surgical or laboratory stabilizers		x	

842139	Filter/purify machine & apparatus for gases, N.E.S.O.I. (including catalytic converters)			x
842199	Filter/purify machine & apparatus parts			x
848340	Gears and gearing and other speed changers (specifically for wind turbines)	x		
848360	Clutches and universal joints (specifically For wind turbines)	x		
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles	6	3	0
850161	AC generators not exceeding 75 kVA (specifically for all electricity generating renewable energy plants)	x		
850162	AC generators exceeding 75 kVA but not 375 kVA (specifically for all electricity generating renewable energy plants)	x		
850163	AC generators not exceeding 375 kVA but not 750 kVA (specifically for all electricity generating renewable energy plants)	x		
850164	AC generators exceeding 750 kVA (specifically for all electricity generating renewable energy plants)	x		
850231	Electric generating sets and rotary converters; wind-powered	x		
850680	Fuel cells use hydrogen or hydrogen-containing fuels such as methane to produce an electric current, through a electrochemical process rather than combustion.	x		
850720	Other lead acid accumulators		x	
853710	Photovoltaic system controller		x	
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes		x	
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof	2	2	0
900190	Mirrors of other than glass (specifically for solar concentrator systems)	x		
900290	Mirrors of glass (specifically for solar concentrator systems)	x		
903210	Thermostats		x	
903220	Manostats		x	
	Column totals	27	16	18

Sources: Compiled by the author from World Bank (2008: Appendix 6) and USTR (2006: Annex 1)

Annex III. Mandated Reports to Congress by Executive Agencies in Climate Change Technology Title of Energy Policy Act of 2005

Topic of Report [Section] Subtitle A	Who Reports*	To Whom	Initial Report Due	Subsequent Reports
National Strategy** [1610(c)]	CCCT	President, Sec. of Energy, Public	Within 18 months after enactment	Every 5 years, or more often
Technology Inventory [1610(e)]	Sec. of Energy	Congress, Public	Not specified	“Periodically”
Barriers to Commercialization and Deployment [1610(f)]	CCTAC	CCCT	Within 1 year after enactment	Annually
Demonstration Projects [1610(g)]	CCCT	President, Congress, Public	Within 18 months after enactment	Every 5 years, or more often
Subtitle B				
Developing Country GHG Emitters [732(a)]	Sec. of State	Congressional authorizing and appropriating committees	Within 180 days after enactment	Update 18 months after initial report and then annually
Inventory of Technologies for Transfer to Developing Countries [733(a)]	Sec. of State and Sec. of Energy	Congress	Within 180 days after completion of Inventory in sec. 1610(e) above	None
Foreign Countries’ Trade Barriers [734(a)(1)]	U.S. Trade Representative	Not specified	Within 1 year after enactment	[None specified but annual needed for sec. 734(b)]
Foreign Countries’ Trade Barriers [734(b)]	U.S. Trade Representative	Congress	Within 1 year after report in sec. 734(a)(1)	Annually
Performance Review of Export Promotion [735(c)]	Interagency Working Group	Congressional authorizing and appropriating committees	Within 180 days after enactment	Annually

* Full names of the reporting entities are as follows:

CCCT = Committee on Climate Change Technology

CCTAC = Climate Change Technology Advisory Committee

Interagency Working Group = Interagency Working Group for Greenhouse Gas Intensity Reducing Technology Export Initiative

** Strategy “to promote the deployment and commercialization of greenhouse gas intensity reducing technologies and practices”

Source: Compiled by the author from the text of Title XVI of the U.S. Energy Policy Act of 2005

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