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Committee on Energy & Commerce
Subcommittee on Energy & Air Quality

Hearings on
Climate Change: Competitiveness Concerns
and Prospects for Engaging Developing Countries

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Statement of
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Summary of Testimony of Gary Clyde Hufbauer, Reginald Jones Senior Fellow, Peterson Institute of International Economics, Washington DC.

- The United States is a leading source of GHG emissions – both in total tonnage and on a per capita basis. The major emitting sectors, in the United States and elsewhere, are energy generation and transportation. Manufacturing activity and industrial processes are less important GHG sources.

- **Regarding questions # 1 and #2 in the Committee's White Paper**, any meaningful form of GHG controls -- whether the limits take the form of a carbon tax, a cap-and-trade system, or performance standards -- will impose heavy costs to the US economy. The control systems adopted by various countries will differ in major respects – both as to the severity of limitations and the details of operation. The combination of enormous costs, huge values and systemic differences will generate tremendous lobbying pressure and protectionist forces.

- Sauce for the goose is sauce for the gander. Any restriction the United States imposes on imports, citing climate change as justification, can just as easily be imposed by other countries on U.S. exports. Any performance standards that the United States imposes on foreign firms, and any "comparability" tests the United States imposes on foreign GHG control systems, can be turned around and imposed on the United States.

- **With respect to questions #3 and #6 in the Committee's White Paper,** a US-led effort to agree on international rules would certainly help bring developing countries on board in reducing GHG emissions. Early US efforts will strengthen the US hand when it comes to designing the post-Kyoto Protocol regime.

- Application of basic WTO rules to foreseeable GHG emissions controls is far from cut and dried. Only a brave or foolish lawyer would give this Committee strong assurance that such-and-such a system of GHG controls is immune from challenge in the WTO. **In a response to question #5 in the Committee's White Paper,** almost all trade restrictive measures stand a fair chance of being challenged in the WTO.

- If the United States enacts its own unique brand of import bans, border taxes, and comparability mechanisms – hoping that measures which flaunt GATT Articles I, III and IX will be saved by the exceptions of GATT Article XX – the probable consequence will be a drawn-out period of trade skirmishes and even trade wars. During these battles, some countries will become more fixated on winning legal cases than fighting the common enemy, climate change. **Global cooperation in limiting emissions could be the first casualty of a unilateral approach that ignores the basic GATT articles.**

Mr. Chairman and members of the Committee, thank you for inviting me to testify. My name is Gary Hufbauer and I am a Senior Fellow at the Peterson Institute for International Economics. The Peterson Institute and the World Resources Institute are jointly conducting research on the intersection between controlling greenhouse gas (GHG) emissions, competitiveness and international trade. This testimony reflects some preliminary findings.

My old friend, William A. Reinsch, President of the National Foreign Trade Council, was originally scheduled to occupy this place, but cannot be with you today. However, the NFTC statement is attached as Annex A, and the Committee will find it quite helpful. I am pleased to associate myself with NFTC's views; likewise the NFTC supports what I have to say. When you have a chance to read Annex A, you will find that the NFTC digs deep into WTO jurisprudence, while my remarks provide a broad overview.

In this statement, I will comment on the relationship between the rules of the world trading system and domestic legislation that would penalize U.S. imports, or foreign countries, when foreign production does not measure up to U.S. standards for limiting GHG emissions. Several tables are appended to my testimony, based on our joint program with the World Resources Institute.[1] For reasons of time, I will only draw broad inferences from the data, but the tables may be useful to the Committee as reference material.

[1] The tables were prepared by Jisun Kim, Research Assistant at the Peterson Institute, who also made valuable contributions to this testimony.

Emission Sources (tables 1, 2 and 3). The United States is a leading source of GHG emissions – both in total tonnage and on a per capita basis. However, China probably surpassed the United States in total tonnage in 2007. The major emitting sectors, in the United States and elsewhere, are energy generation and transportation. Manufacturing activity and industrial processes are less important GHG sources. These facts imply that the United States is vulnerable to legislation abroad that might seek to call U.S. practices to account, not only with respect to manufactured exports and industrial processes, but also for its high levels of GHG emissions in total and on a per capita basis.

Implied Value of GHG Emissions Taxes or Caps (tables 1 and 2). Serious limits on GHG emissions – of the sort proposed by my colleague William Cline, the Yale economist, William Nordhaus, and the Stern Report – will entail heavy costs.[2] **Regarding questions # 1 and #2 in the Committee's White Paper**, any form of GHG controls -- whether the limits take the form of a carbon tax, a cap-and-trade system, performance standards, or some other method -- will impose heavy costs to the US economy. One major difference in approaches is whether permits are assigned to private companies, thereby conferring valuable "quota rents" on the recipients, or whether limits are imposed by way of auction or tax systems so that the government collects substantial revenues. Another major difference is the choice of activity where limits are designed to "bite": for example, on power generation and refineries, or also on transportation and

[2] For references to these economists and others, see the Stern Report, available at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm, the study by Nordhaus at http://nordhaus.econ.yale.edu/ and the study by Cline at http://www.copenhagenconsensus.com/Default.aspx?ID=165.

manufacturing. Other parameters also differ between approaches: trading of permits, domestically and internationally, banking and borrowing of permits, special auctions to curtail price spikes, etc.

Until international negotiations are conducted, it is difficult to say that what approach will best encourage developing countries to adopt their own GHG emission controls while simultaneously protecting US industry.[3] From an administrative standpoint, the simplest approach would be a uniform carbon tax, imposed at the border on imports from countries that do not adopt and enforce the same uniform rate. The carbon tax approach also has well-known efficiency features – reducing the most GHG emissions for the least cost. But it would be extremely difficult to marshal legislative support for such a tax in the US Congress or abroad.

Instead, the more likely outcomes are messy "hybrid" systems that differ from country to country. Each country will favor a mixture of subsidies, border adjustments, and other GHG controls that foster its own producers, especially "national champions". The United States is well along this path with respect to biofuels, having enacted measures that generously support ethanol production and firms like Archer-Daniels-Midland. President Nicholas Sarkozy of France and other European leaders have pushed the same approach.

[3] The US largest foreign suppliers of carbon-intensive goods are countries like Canada, the European Union, and Russia that emit considerably less carbon than the United States. In 2005, China accounted for less than 7 percent of US carbon-intensive imports except cement: 7 percent of steel imports; 3 percent of aluminum imports; 4 percent of paper imports; and 14 percent of cement imports (source: UN Comtrade).

Three important implications should be emphasized. First, any meaningful system of GHG controls will entail enormous costs and create huge values. Second, the control systems adopted by various countries will almost certainly differ in major respects – both as to the severity of limitations and the details of operation. Third, the combination of enormous costs, huge values and systemic differences will generate tremendous lobbying pressure and protectionist forces.

Tables 1 and 2 illustrate the cost/value implication. A control system which, in terms of effect, equates to $100 per metric ton of emitted carbon-equivalent (a middling figure for 2020), would generate costs/values of around $190 billion annually for the United States alone, at current emission levels.[4] For the European Union or China, the costs/values would be around $130 billion annually. Even if countries agree that limits of this severity are justified, no two political systems will agree on the same methods for imposing their controls. Lobbying pressure will be intense to exclude "preferred" activities from any limits (e.g., residential electricity and heat, agriculture), and industrial firms will do their utmost to acquire free emission permits for their own activities. Out of the political maelstrom, it is certain that some countries will use domestic GHG controls as a rationale for curtailing imports.

Trading System Dangers (tables 4, 5 and 6). WTO rules and decided cases are summarized in my tables. Before surveying the rules, an overriding observation must be stressed. **Sauce for the goose is sauce for the gander. Any restriction the United States imposes on imports, citing climate change as justification, can just as easily be**

[4] Note that $100 per metric ton of carbon converts to $27 per metric ton of CO_2 equivalent.

imposed by other countries on U.S. exports. Any performance standards that the United States imposes on foreign firms, and any "comparability" tests the United States imposes on foreign GHG control systems, can be turned around and imposed on the United States. An example will illustrate. The United States might impose its own carbon tax or performance standards on imports of steel rebar products from India, citing an exceptionally high level of carbon emissions per ton of Indian rebar production. In turn, India might impose a duty on all imports from the United States, citing the exceptionally high figure of U.S. per capita CO_2 emissions, compared to the world average (table 3).

Does this observation mean that, out of fear of retaliation, the United States should do nothing while the planet heats up? Of course not. But it does mean that the United States -- as leader of the world trade and financial system -- should make an exceptional effort to negotiate agreed international rules before blocking imports or penalizing foreign GHG control measures. The open system of world trade and investment has delivered enormous benefits to the U.S. since the Second World War. Our calculations indicate that globalization delivers about $1 trillion of benefits annually to the U.S. economy, around $10,000 per American household.[5] It would be a tragedy to endanger even a small part of these benefits by charging ahead with GHG legislation that takes no account of views abroad.

[5] Scott C. Bradford, Paul L.E. Grieco and Gary Clyde Hufbauer, "The Payoff to America from Global Integration", chapter 2 in C. Fred Bergsten, *The United States and the World Economy*, Washington DC: Institute for International Economics, 2005.

With respect to questions #3 and #6 in the Committee's White Paper, a US-led effort to agree on international rules would certainly help bring developing countries on board in reducing the GHG emissions. An early US effort will strengthen the US hand when it comes to designing the post-Kyoto Protocol regime. Any legislation enacted by the US Congress in the next year should emphasize foremost the urgency of international negotiations and postpone the imposition of import penalties or comparability mechanisms for at least three years.

Let me now turn to existing WTO rules that bear on climate change legislation. They contain several disciplines, summarized in tables 4, 5 and 6. At the same time, they permit many trade restrictions and penalties, in the name of ensuring human health and safety, and protecting the environment. But the existing rules do not preclude the eruption of tit-for-tat retaliation, if a major player, such as the United States, the European Union, or China, imposes its own brand of GHG trade policy without the prior blessing of a multilateral agreement.

Any U.S. climate legislation which includes trade restrictive measures should reflect the core disciplines of the existing WTO system. If and when WTO members negotiate a new code on trade rules with respect to GHG emissions, these core disciplines are almost certain to be included.

- **GATT Article I (Most Favored Nation Treatment):** Non-discrimination is a core principle in the GATT/WTO system, and is reflected in GATT Articles I and

III. Article I requires members to ensure that -- in the absence of an exception -- when favorable treatment is accorded to the goods or services imported from one country, the same treatment must be accorded to the products of all WTO members.

- **GATT Article III (National Treatment):** This article requires that the products of WTO members be treated no less favorably than "like" products made by firms in the importing country. In decided cases, this requirement has been strictly applied.
- **GATT Article XI (General Elimination of Quantitative Restrictions):** This article prohibits the imposition of quotas, import or export licenses, or other measures on trading partners unless they fall into one of the exceptions listed in paragraph 2 of GATT Article XI.
- **GATT Article XX (General Exceptions):** Even though an import restriction on imports violates another GATT article, including the articles discussed above, it might be acceptable if the trade measure conforms to the chapeau of GATT Article XX and falls under one of subsections. Relevant to climate change, these subsections allow otherwise inconsistent trade restrictions if they are "necessary" to protect human, animal or plant life or health (Article XX (b)) or if they conserve exhaustible natural resources (Article XX (g)), a term which covers GHG emissions.

Application of these basic rules to foreseeable GHG emissions controls is far from cut and dried. The NFTC published an excellent paper in December 2007, titled

***WTO Compatibility of Four Categories of U.S. Climate Change Policy*, which explores many nuances. I commend this paper to your attention. Only a brave or foolish lawyer would give this Committee strong assurance that such-and-such a system of GHG controls is immune from challenge in the WTO. When the Committee hears such assurances, it should ask its own legal staff to prepare a "devil's advocacy" memo describing the WTO vulnerabilities of the proposed system.**

For now, the most reliable guidance for incorporating trade measures in the U.S. climate policy in a WTO-consistent manner can be found by examining the Appellate Body's decisions on previous dispute cases and its interpretation of the shelter available under GATT Article XX. It must be remembered, however, that Appellate Body decisions are made case-by-case; they depend on the particular facts and circumstances, and the rule of *stare decisis* does not strictly apply. The Appellate Body's rulings in previous cases (table 6) show considerable sympathy with environmental concerns and have increased the likelihood that trade restrictions in furtherance of GHG emissions controls would pass muster under WTO rules.

However, in the absence of a negotiated compact that defines WTO "red lines" and "green spaces" with respect to trade measures that foster GHG controls worldwide, tit-for-tat retaliation and prolonged WTO litigation are all but certain if each country goes its own way with climate legislation. **In a response to the question #5 in the Committee's White Paper,** almost all trade restrictive measures stand a fair chance of being challenged in the WTO. The best guidelines I can offer are these: engage in good faith

international negotiations before restricting trade; ensure that the measures adopted make a genuine contribution to the reduction of GHG emissions; and avoid discrimination, both among foreign partners and between US producers and foreign producers.

If the United States enacts its own unique brand of import bans, border taxes, and comparability mechanisms – hoping that measures which flaunt GATT Articles I, III and IX will be saved by the exceptions of GATT Article XX – the probable consequence will be a drawn-out period of trade skirmishes and even trade wars. During these battles, some countries will become more fixated on winning legal cases than fighting the common enemy, climate change. **Global cooperation in limiting emissions could be the first casualty of a unilateral approach that ignores the basic GATT articles.**

ANNEX A

Climate Change: Competitiveness Concerns and Prospects for Engaging Developing Countries
Committee on Energy and Commerce, Subcommittee on Energy and Air Quality
Statement of William A. Reinsch, President, National Foreign Trade Council
March 5, 2008

I represent the National Foreign Trade Council, the country's oldest and largest trade association devoted specifically to international trade and tax policy. Our members are primarily global companies doing business in virtually every country on earth. The NFTC supports an open, rules-based trading system, international tax policies that contribute to economic growth and job creation, and opposes unilateral economic sanctions.

In my statement I want to cover three topics: WTO compliance issues surrounding climate change proposals, the likelihood of retaliation against unilateral action either inside or outside the WTO dispute resolution process, and our preference for addressing climate change through multilateral action. The first and third topics were addressed in detail in a paper we released last December titled, "WTO – Compatibility of Four Categories of U.S. Climate Change Policy," which I commend to the Committee's attention.

In making these comments, I want to make clear that the National Foreign Trade Council is not an environmental organization and has not taken a position on the merits of specific climate change proposals. We do, however, believe strongly that any action that is taken

should be compatible with our multilateral obligations, and we will continue to evaluate new proposals against that standard as they appear.

WTO COMPLIANCE ISSUES

In our paper we examined four climate change bills pending in the 110th Congress from the perspective of their compatibility with WTO rules regarding national treatment, subsidies, and whether the measures proposed are more trade restrictive than necessary. We do not – and cannot – conclude definitively that a measure is "WTO-illegal." First and foremost, WTO jurisprudence tends to be case-specific. Disputes are settled based on the facts of the case presented, and they are not always regarded as precedents for future cases where the facts might well be different. Thus, although one might speculate about whether a particular measure is likely to lead to dispute resolution and then draw inferences about how such a case might be decided, it would not be correct to make a definitive statement about the "legality" of a particular measure, since that can only be determined as the result of a WTO proceeding.

Following is a brief summary of our conclusions. For more detail I would refer you to our paper.

U.S. domestic policies to address climate change can, in principle, be compatible with World Trade Organization (WTO) rules and the multilateral trading system. However, some policy tools are likely to be more trade-distorting than others and conflict with

specific WTO provisions, raising the costs and jeopardizing the long-term success of comprehensive climate change abatement programs in the United States. For example:

- Energy efficiency requirements and standards, such as the renewable fuel standard found in H.R. 6, are likely to violate GATT Article III on national treatment. In fact, similar measures adopted in the United States in the 1990s were successfully challenged in a landmark WTO dispute. By contrast, CAFE standards in H.R. 1509 appear to be more WTO-compatible.

- Government-administered eco-labeling schemes in H.R. 6 may violate the WTO Agreement on Technical Barriers to Trade for constituting measures that are "more trade-restrictive than necessary" to protect the environment, even if this objective is "legitimate."

- Subsidies for renewable energy are very likely to violate the WTO Agreement on Subsidies and Countervailing Measures. For example, loan guarantees for renewable fuels facilities in H.R. 6 are financial contributions targeting specific industries and commodity products; they may act to increase the U.S. world market share in biofuels while decreasing foreign countries' U.S. market share in conventional fuels. Any subsidy that affects the export performance of a U.S.-produced climate-friendly good is likely to be prohibited under WTO rules.

- In theory, cap-and-trade programs may be one of the most WTO-compatible policy instruments available, but in practice, such programs are accompanied by standards and regulations, eco-labeling, subsidies, and other measures that raise WTO-compatibility concerns. In addition, a particularly alarming provision in S.

> 2191 creates a reserve of emissions permits for U.S. importers of foreign goods, which is separate and additional to the national reserve. It effectively imposes a tax on imports from WTO Members who do not utilize clean production processes and methods. This is likely to violate GATT Article III on national treatment and in the absence of a multilateral agreement will almost certainly be challenged by industry-intensive developing countries where environmental standards are not as stringent as in the United States.

The last conclusion, relating to cap and trade, is the only one in our paper that has proved controversial, and I want to spend another minute on it. Our analysis of cap and trade largely tracks that found in the Committee's white paper. While the provision in S. 2191 was clearly drafted to take into account previous WTO decisions, we believe it is likely that it will be challenged – as will virtually any action the U.S. takes – and we are not confident it will ultimately pass muster.

To go into the weeds a bit, we believe there is no dispute that an international reserve allotment program on its face violates GATT Article III. Indeed, the provision in S. 2191 implicitly acknowledges that by being specifically drafted to fit into one of the permitted exceptions – Article XX(g), which relates to conservation of exhaustible natural resources.

In the *Shrimp-Turtle* case, the Appellate Body suggested that to qualify for this exception, the measure would have to concerned with the conservation of an "exhaustible natural resource" within the meaning of Article XX(g), it would have to relate to the

conservation of natural resources, and it would have to be "made effective in conjunction with restrictions on domestic production or consumption."

There is general agreement the proposal meets the first criterion. With respect to the second, there are good arguments on both sides. If the Appellate Body were to conclude that the measure was primarily an economic one designed to level the playing field by increasing the price of imports from countries not adopting controls on their greenhouse gas emissions, it could decide that the measure only "incidentally" focused on conservation. The third criterion would depend on implementation. For example, if the U.S. provided plentiful free allowances to domestic producers, the Appellate Body might conclude the domestic and foreign restrictions were not comparable.

Even with those uncertainties, however, the most likely basis for complaint against this proposal would be under the Chapeau of GATT Article XX. To qualify, the United States would have to show that it engaged in "serious, across-the-board negotiations with the objective of concluding bilateral or multilateral agreements, and that the measure itself shows flexibility in taking into account local conditions in other countries and that its implementation does not suggest an intent to discriminate.

The Article XX Chapeau is essentially focused on how measures are implemented, which means that any final judgment on WTO compatibility cannot be reached until after the measure is in place and implementation begun. The manner in which the International Reserve Allowance program is applied may pass the Chapeau of Article XX, following

the reasoning of the *Shrimp-Turtle* case, e.g. because Title VI of S. 2191 explicitly recognizes and builds cooperatively on UNFCCC principles and international environmental efforts. However, in contrast, the provisions in question may fail to pass the Chapeau through reasoning similar to the *U.S.-Taxes on Automobiles* case. In that case, two separate accounting systems were established for importers and domestic producers of automobiles, in effect regulating imported products based on their origin of manufacture rather than on any qualities intrinsic to the automobiles. The International Reserve Allowance Program also envisions subjecting imports to regulation based on their origin of manufacture, and via a reserve of allowances "separate from, and established in addition to" the domestic reserve. As both circumstances have raised WTO compliance issues in the past, in at least one case, it is appropriate to raise the possibility that this program may be vulnerable to an unfavorable WTO decision in the future. WTO panels have been careful to observe the unique circumstances surrounding each case that has come before them. The subjective nature of judging the *manner* in which the International Reserve Allowance program will be implemented, for purposes of the Chapeau of Article XX, makes it worthy of an on-going, constructive debate, particularly for those who wish to see the program succeed in the long term.

OTHER RETALIATORY ACTIONS

While much of the focus of debate on the trade-related provisions of cap and trade proposals has been on WTO compliance, there is also a significant likelihood states will retaliate outside of the WTO dispute resolution process. There is no question that a program which limits imports and/or increases their price would be opposed by countries

exporting the affected products. While they might well litigate, we believe it is also likely they would take other, more direct action.

Unfortunately, there is a long history in this regard. China, for example, when confronted with a U.S. action or policy it opposes, has canceled mil-mil consultations, rejected requests for naval ship visits, blocked proposed investments, canceled or reduced the scope of buying missions, purchased major items from other countries, and taken other actions to indicate its displeasure. As you can see, these actions are not always strictly in the trade area – they often spill over into foreign policy. The classic case of this behavior was in 1983 when the United States imposed textile import quotas. The Chinese response was to stop buying wheat and other agricultural products.

While WTO rules impose some constraints on such behavior, there remain many opportunities for nontransparent retaliation – new inspection requirements, "problems" with the customs authorities, surprise audits, unexpected labor problems, and so on. This is not to argue that the United States should not act for fear of retaliation, but in a globally integrated economy, the potential pain associated with these actions could be significant, suggesting that we should certainly be aware of the possibility before we act, do our best to minimize its likelihood, and prepare an appropriate response in the event it occurs.

MULTILATERAL ACTION AND TIMING

Finally, I want to suggest that the approach most likely to obviate all these various problems is a multilateral one in which all relevant countries agree to take parallel steps. This would significantly reduce the possibility of either WTO litigation or direct retaliation. We would prefer that the United States devote its energy to participating in and concluding a multilateral process. If it chooses instead to lead by example through unilateral legislation, it runs the risk of the problems I have described occurring unless it were to make its legislation contingent on other nations following suit.

At the same time, the final conclusion of our paper was that international law in this area is relatively unformed, which means the advantage will go to the early actor – the first proposals implemented will more likely become the template for slower countries and will more likely become the foundation on which WTO rules will be based in the future. Thus, it is in the United States' interest to act sooner rather than later in order to increase the likelihood that our approach will ultimately be regarded as legitimate. Many observers also believe the science argues for early action, which may well be so, but there are also legal reasons for moving sooner rather than later.

Table 1 Hypothetical carbon tax equivalent amounts calculated based on GHG emissions by gas
(assuming that carbon taxes or carbon caps increase the value of emissions by $100 per metric ton of carbon equivalent) [a]

GHG emissions by gas, 2000 (million metric tons of CO_2e)

	US	EU	China	Russia	Japan	India	Brazil	World
CO_2	5,791	3,843	3,400	1,533	1,266	1,034	337	26,351
CH_4	546	444	788	307	21	499	366	6,020
N_2O	396	408	645	55	37	67	241	3,114
HFCs	101	39	42	4	34	5	4	259
PFCs	14	10	6	8	6	1	2	81
SF_6	19	3	2	2	2	1	1	40
GHG total	6,868	4,747	4,883	1,909	1,366	1,607	950	35,865

When implied emissions value is $100 per metric ton of carbon emitted (billions of US $)

	US	EU	China	Russia	Japan	India	Brazil	World
CO_2	158.1	104.9	92.8	41.9	34.6	28.2	9.2	719.4
CH_4	14.9	12.1	21.5	8.4	0.6	13.6	10.0	164.3
N_2O	10.8	11.1	17.6	1.5	1.0	1.8	6.6	85.0
HFCs	2.8	1.1	1.1	0.1	0.9	0.1	0.1	7.1
PFCs	0.4	0.3	0.2	0.2	0.2	0.0	0.1	2.2
SF_6	0.5	0.1	0.1	0.1	0.1	0.0	0.0	1.1
GHG total	187.5	129.6	133.3	52.1	37.3	43.9	25.9	979.1

a. The implied emission value of $100 per metric ton of carbon equivalent emitted equals to the amount of $27.3 per metric ton of CO_2e emitted. (based on the conversion method used by EPA and IPCC which derives a quantity of carbon multiplying a quantity of CO_2 by 12/44).

Source: Climate Analysis Indicators Tool (CAIT) Version 5.0. (Washington, DC: World Resources Institute, 2007).

Table 2 Hypothetical carbon tax equivalent amounts calculated based on GHG emissions by sector
(assuming that carbon taxes or carbon caps increase the value of emissions by $100 per metric ton of carbon equivalent) [a]

GHG emissions by sector, 2000 (million metric tons of CO_2e)

	US	EU	China	Russia	Japan	India	Brazil	World
Electricity & Heat	2,685	1,477	1,466	917	466	556	50	11,582
Transportation	1,714	879	219	176	257	92	126	5,098
Manufacturing & Construction	661	649	903	218	270	225	94	4,748
Industrial Process	208	226	377	32	87	57	31	1,369
Residential & Other Fuel Conbustion	720	780	463	210	202	139	45	3,964
Agriculture	444	493	1,041	110	34	375	549	5,729
Fugitive Emissions & Waste	416	225	290	243	10	150	47	2,958
GHG total	6,846	4,730	4,759	1,906	1,326	1,595	942	35,440

When implied emissions value is $100 per metric ton of carbon emitted (billions of US $)

	US	EU	China	Russia	Japan	India	Brazil	World
Electricity & Heat	73.3	40.3	40.0	25.0	12.7	15.2	1.4	316.2
Transportation	46.8	24.0	6.0	4.8	7.0	2.5	3.4	139.2
Manufacturing & Construction	18.0	17.7	24.7	6.0	7.4	6.1	2.6	129.6
Industrial Process	5.7	6.2	10.3	0.9	2.4	1.6	0.8	37.4
Residential & Other Fuel Conbustion	19.7	21.3	12.6	5.7	5.5	3.8	1.2	108.2
Agriculture	12.1	13.5	28.4	3.0	0.9	10.2	15.0	156.4
Fugitive Emissions & Waste	11.4	6.1	7.9	6.6	0.3	4.1	1.3	80.8
GHG total	186.9	129.1	129.9	52.0	36.2	43.5	25.7	967.5

a. The implied emission value of $100 per metric ton of carbon equivalent emitted equals to the amount of $27.3 per metric ton of CO_2e emitted. (based on the conversion method used by EPA and IPCC which derives a quantity of carbon multiplying a quantity of CO_2 by 12/44).

Source: Climate Analysis Indicators Tool (CAIT) Version 5.0. (Washington, DC: World Resources Institute, 2007).

Table 3 CO_2 emissions from fuel combustion, 2005 [a]

Million Tons of CO_2

	Total	% change 2005/1990	By type of fuel				By sector					CO_2 per unit of GDP (kg/2000 USD)	CO_2 per capita (t/capita)
			Coal	Oil	Gas	Other[b]	Electricity & Heat	Manufacturing Industries & Construction	Transport	Residential	Other		
United States	5,817	20	2,131	2,457	1,202	28	2,485	636	1,813	347	535	0.53	19.61
China	5,060	129	4,172	802	86	-	2,469	1,593	332	243	424	2.68	3.88
European Union (27)	3,976	-3	1,223	1,706	1,015	32	1,433	661	954	487	441	0.43	8.09
Russia Federation	1,544	-30	430	315	783	16	872	222	206	118	126	4.41	10.79
Japan	1,214	15	419	620	171	4	472	268	249	68	157	0.24	9.50
India	1,148	96	774	312	62	-	659	243	97	70	77	1.78	1.05
Brazil	329	71	50	241	38	-	34	99	137	16	43	0.49	1.77
Total	19,088		9,198	6,453	3,357	80	8,424	3,722	3,789	1,349	1,803		
Memorandum:													
World Total	27,136	29	10,980	10,717	5,347	93	11,009	5,184	6,337	1,889	2,718	0.75	4.22

a. OECD source noted that CO_2 emissions are calculated using the IEA energy balances, IPCC Sectoral Approached the default emissions factors from the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories. They may differ from National Communication submitted by the parties to the UNFCCC.

b. Other includes industrial waste and non-renewable municipal waste.

Source: International Energy Agency (IEA), CO_2 emissions from fuel combustion 1971-2005 (2007 edition), OECD

Table 4 GATT/GATS Articles applicable to environmental issues

Article	Text language
GATT Article I:1 General Most-Favoured-Nation Treatment	1. With respect to customs duties and charges of any kind imposed on or in connection with importation or exportation or imposed on the international transfer of payments for imports or exports, and with respect to the method of levying such duties and charges, and with respect to all rules and formalities in connection with importation and exportation, and with respect to all matters referred to in paragraphs 2 and 4 of Article III, any advantage, favour, privilege or immunity granted by any contracting party to any product originating in or destined for any other country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all other contracting parties....
GATT Article II:1 (a) & (b) /2 (a) Schedules of Concessions	1. (a) Each contracting party shall accord to the commerce of the other contracting parties treatment no less favourable than that provided for in the appropriate Part of the appropriate Schedule annexed to this Agreement. (b) The products described in Part I of the Schedule relating to any contracting party, which are the products of territories of other contracting parties, shall, on their importation into the territory to which the Schedule relates, and subject to the terms, conditions or qualifications set forth in that Schedule, be exempt from ordinary customs duties in excess of those set forth and provided therein. Such products shall also be exempt from all other duties or charges of any kind imposed on or in connection with the importation in excess of those imposed on the date of this Agreement or those directly and mandatorily required to be imposed thereafter by legislation in force in the importing territory on that date. 2. Nothing in this Article shall prevent any contracting party from imposing at any time on the importation of any product: (a) a charge equivalent to an internal tax imposed consistently with the provisions of paragraph 2 of Article III in respect of the like domestic product or in respect of an article from which the imported product has been manufactured or produced in whole or in part....
GATT Article III: 1, 2 & 4 National Treatment on Internal Taxation and Regulation	1. The contracting parties recognize that internal taxes and other internal charges, and laws, regulations and requirements affecting the internal sale, offering for sale, purchase, transportation, distribution or use of products, and internal quantitative regulations requiring the mixture, processing or use of products in specified amounts or proportions, should not be applied to imported or domestic products so as to afford protection to domestic production. 2. The products of the territory of any contracting party imported into the territory of any other contracting party shall not be subject, directly or indirectly, to internal taxes or other internal charges of any kind in excess of those applied, directly or indirectly, to like domestic products. Moreover, no contracting party shall otherwise apply internal taxes or other internal charges to imported or domestic products in a manner contrary to the principles set forth in paragraph 1. 4. The products of the territory of any contracting party imported into the territory of any other contracting party shall be accorded treatment no less favourable than that accorded to like products of national origin in respect of all laws, regulations and requirements affecting their internal sale, offering for sale, purchase, transportation, distribution or use. The provisions of this paragraph shall not prevent the application of differential internal transportation charges which are based exclusively on the economic operation of the means of transport and not on the nationality of the product

Table 4 GATT/GATS Articles applicable to environmental issues (continued)

GATT Article XI:1 & 2 (a) (b) (c) General Elimination of Quantitative Restrictions	1. No prohibitions or restrictions other than duties, taxes or other charges, whether made effective through quotas, import or export licences or other measures, shall be instituted or maintained by any contracting party on the importation of any product of the territory of any other contracting party or on the exportation or sale for export of any product destined for the territory of any other contracting party. 2. The provisions of paragraph 1 of this Article shall not extend to the following: (a) Export prohibitions or restrictions temporarily applied to prevent or relieve critical shortages of foodstuffs or other products essential to the exporting contracting party; (b) Import and export prohibitions or restrictions necessary to the application of standards or regulations for the classification, grading or marketing of commodities in international trade; (c) Import restrictions on any agricultural or fisheries product, imported in any form,* necessary to the enforcement of governmental measures which operate.....
GATT Article XX: (b) (g) General Exceptions	Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any contracting party of measures: "... (b) necessary to protect human, animal or plant life or health; "... (g) relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption; ..."
GATS Article XIV: General Exceptions	Subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where like conditions prevail, or a disguised restriction on trade in services, nothing in this Agreement shall be construed to prevent the adoption or enforcement by any Member of measures; "...(b) necessary to protect human, animal or plant life or health;..."

Source: WTO website (http://www.wto.org/english/docs_e/legal_e/legal_e.htm#finalact. Accessed on Nov. 7, 2007)

Table 5 US Climate Policy Options on Energy Intensive Imports [a]

Restriction on Imports		Justified under GATT Articles?				
		Article I *(MFN)*	**Article II** *(Tariff Schedules)*	**Article III** *(National Treatment)*	**Article XI** *(Quotas)*	**Article XX** *(Exceptions)*
Import restriction applied to penalize "foreign emitted carbon" (measure applied only against imports)	*Import ban (quantitative restriction)*				***No because:*** Violated	**Yes.** If any provision or restriction on imports can be justified under Article XX, it is permitted even though it violates other GATT rules. Whether a trade restrictive measure is determined to be "necessary" under Article XX requires consideration of three factors: 1) how trade-restrictive is the challenged measure; 2) the value of what the measure is designed to protect; 3) the contribution of the measure to the objective. However, even "necessary" trade restrictive measures should not discriminate between trading partners, or against imports by comparison with domestic goods.
	Additional or punitive tariff	***No because:*** Violated	Violated			
	Anti-dumping or countervailing duties	**No.** Under present GATT rules, even if the exporting country does not restrict its carbon emissions, the social cost of carbon cannot be labeled as dumping or a subsidy. The failure to impose a carbon tax, or otherwise internalize the full price of carbon, does not currently give other WTO members the right to impose penalty duties on imports.				
Competitive provision applied as an extension of domestic US climate policy (measure applied both to domestic production and imports)	*Carbon tax*	***Yes if:*** Not violated		Not violated. Carbon taxes can be justified as an "internal tax" under GATT Article III:2 and thus can be adjusted at the border.		
	Cap-and-trade system	***Yes if:*** Not violated		Not violated. The cost of purchasing carbon credits can be justified as an "internal tax" or "other internal charge of any kind" under GATT Article III:2 and thus can be adjusted at the border.		
	Quantitative carbon regulation	***Yes if:*** Not violated		Not violated. Article III permits regulations as long as they are not discriminatory. However, there is a "product" vs. "process" issue. Even if a carbon regulation can not be adjusted at the border by imposing a tax under GATT rules, extension of the regulation to imports could be justified under the Agreement on Technical Barriers to Trade.		

a. Cells are in shadow when the referenced GATT Articles are unlikely to apply.

Source: Adapted and updated from Pauwelyn, Joost. 2007. *US Federal Climate Policy and Competitiveness Concerns: The Limits and Options of International Trade Law*. NI WP 07-22. Nicholas Institute for Environmental Policy Solutions. Duke University

Table 6 Selected environmental dispute settlement cases (GATT and WTO)

Case Detail [a]	Background	Key Panel and Appellate Body Findings
WTO DS332 (Dec. 2007) **"Brazil-Retreaded Tyres" case** *:Measures Affecting Imports of Retreaded Tyres* ***Complainants:*** European Communities ***Respondent*** : Brazil	In June 2005, the European Communities requested consultations with Brazil on the imposition of measures that adversely affect exports of retreaded tyres from the EC to Brazil. Brazil banned the import of retreaded tyres and used tyres (two different categories). Brazil also imposed a fine of 400 BRL per tyre on the importation. However,Brazil has not imposed similar measures on retreaded tyres imported from its Mercosur partners. Brazil argued that waste tyres were breeding grounds for mosquitoes, and therefore the import ban was necessary to prevent the spread of mosquito-borne illnesses such as malaria and dengue fever.	* The Panel found Brazil's import prohibition on retreaded tyres violated GATT Article XI:1 and could not be justified under GATT Article XX(b). * The Appellate Body (AB) found that the import ban might be provisionally justified under GATT Article XX(b), which permits measures "necessary to protect human, animal, or plant life or health." * The AB has introduced a new "material" contribution test to determine when a measure will be considered as "necessary" under Article XX(b). The AB recognized that measures should make a "material" contribution (not marginal) to the objective. However, the AB has also stated that the “necessity” of measures can be assessed both qualitatively and quantitatively and the results from certain actions may only be evaluated with the benefit of time. * The AB found that the unequal application of the ban meant the measure was being applied in a discriminatory manner, contrary to the requirement of the "chapeau" of GATT Article XX.
WTO DS 58 (Nov. 1998) **"US-Shrimp" case** *:Import Prohibition of Certain Shrimp and Shrimp Products* ***Complainants:*** India, Malaysia, Pakistan and Thailand ***Respondent*** : United States	The US Endangered Species Act of 1973 listed five species of sea turtles in US waters that are endangered. The act prohibited their “taking” in the US territorial sea or the high seas. (“Taking” means harassment, hunting, capture, or killing). Under the act, the US required that US shrimp trawlers use “turtle excluder devices” (TEDs) in their nets when fishing in areas where there is a significant likelihood of encountering sea turtles. Section 609 of US Public Law 101–102, enacted in 1989, dealt with imports. Among other provisions, shrimp harvested with technology that may adversely affect certain sea turtles may not be imported into the US — unless the harvesting nation had a regulatory program and an incidental take-rate comparable to that of US vessels, or the particular fishing area did not pose a threat to sea turtles.	* The Panel found that the US prohibition (Section 609 of US Public law 101-162) on imported shrimp and shrimp products violated GATT Article XI and can not be justified under GATT Article XX. * The AB held that although the US import ban was related to the conservation of exhaustible natural resources and covered by Article XX(g) exception, it could not be justified under Article XX because the ban constituted "arbitrary and unjustifiable" discrimination under the chapeau of Article XX.

Table 6 Selected environmental dispute settlement cases (GATT and WTO), continued

Case Detail [a]	Background	Key Panel and Appellate Body Findings
WTO DS 58-Article 21.5 (Nov. 2001) "US-Shrimp" case :Import Prohibition of Certain Shrimp and Shrimp Products ***Complainant:*** Malaysia ***Respondent:*** United States	In 2000, contesting that the United States had not implemented the recommendations of the Dispute Settlement Body (DSB), Malaysia requested that the matter be referred to the original panel pursuant to Article 21.5 of the Dispute Settlement Understanding (DSU). In particular, Malaysia considered that by not lifting the import prohibition and not taking the necessary measures to allow the importation of certain shrimp and shrimp products in an unrestrictive manner, the United States had failed to comply with the recommendations and rulings of the DSB.	* The Panel concluded that the measure adopted by the United States in order to comply with the recommendations and rulings of the DSB violated Article XI:1. * The AB found that the revised US guidelines were justified under Article XX (g), as (i) it related to the conservation of exhaustible natural resources and; (ii) it now met the conditions of the chapeau of Article XX when applied in a manner that no longer constituted a means of arbitrary discrimination as a result of (i) the serious, good faith efforts made by the United States to negotiate an international agreement and; (ii) the new measure allowing "sufficient flexibility" by requiring that other members' programs simply be "comparable in effectiveness" to the US program. In this regard, the AB rejected Malaysia's contention.
WTO DS 2 & 4 (May 1996) "US-Gasoline" case *:Standard for Reformulated and Conventional Gasoline* ***Complainants*** : Brazil and Venezuela ***Respondent*** : United States	Venezuela requested consultations in January 1995 and Brazil on April 1995. They asserted that US Gasoline rules under the US Clean Air Act discriminate against imported gasoline. The Act set out the rules for establishing baseline figures for gasoline sold on the US market (different methods for domestic and imported gasoline), with the purpose of regulating the composition and emission effects of gasoline to prevent air pollution. Venezuela and Brazil claimed that the stricter rules did not meet the "national treatment" standard of GATT Article III and clean air does not qualify as an "exhaustible natural resource" within the meaning of Article XX(g).	* The Panel found that the measure treated imported gasoline "less favorably" than domestic gasoline in violation of Article III:4. In particular, under the regulation, importers had to adapt to an average standard (i.e., the "statutory baseline"), that had no connection to the particular gasoline imported, while refiners of domestic gasoline had only to meet a standard linked to their own production in 1990. * In respect of the US defense under Article XX(g), the AB modified the Panel's reasoning and found that the measure was "related to" the "conservation of exhaustible natural resources," and thus fell within the scope of Article XX(g). However, the measure was still not justified by Article XX because its discriminatory application constituted "unjustifiable discrimination" and a "disguised restriction on international trade" under the chapeau of Article XX.

Table 6 Selected environmental dispute settlement cases (GATT and WTO), continued

Case Detail [a]	Background	Key Panel and Appellate Body Findings
GATT DS 31/R **"US-Automobiles" case** *:Taxes on automobiles* ***Complainant*** : European Union ***Respondent*** : United States	Three US measures on automobiles were under examination: the luxury tax on automobiles ("luxury tax"), the gas guzzler tax on automobiles ("gas guzzler"), and the Corporate Average Fuel Economy regulation ("CAFE"). The European Community complained that these measures were inconsistent with GATT Article III and could not be justified under GATT Article XX(g) or (d). The US argued that these measures were consistent with the GATT.	* The Panel found that both the luxury tax (which applied to cars sold for over $30,000) and the gas guzzler tax (which applied to the sale of automobiles attaining less than 22.5 miles per gallon) were consistent with Article III:2. However, the Panel found that the CAFE regulation was inconsistent with Article III:4 because the separate foreign fleet accounting system discriminated against foreign cars, and the fleet averaging differentiated between imported and domestic cars on the basis of factors relating to control or ownership of producers or importers, rather than on the basis of factors directly related to the products as such. Similarly, the Panel found that separate foreign fleet accounting was not justified under Article XX(g). * The Panel Report was circulated in 1994 (during the GATT-1947 era) but not adopted. The conclusion of the Uruguay Round and the establishment of the WTO in 1995 rendered prior GATT panel reports moot. The European Union did not renew the case under the auspices of the WTO Dispute Settlement Mechanism.
GATT DS 29/R **"US-Tuna" Case** also known as "Son of Tuna-Dolphin" case *: Restriction on imports of tuna* ***Complainants*** : European Economic Community and the Netherlands ***Respondent*** : United States	The EEC and the Netherlands complained that both the primary and the intermediary nation embargoes on imported tuna, enforced pursuant to the Marine Mammal Protection Act (see the "Tuna-Dolphin" case below), did not fall under GATT Article III, were inconsistent with GATT Article XI:1 and were not covered by any of the exceptions of GATT Article XX. The US argued that the intermediary nation embargo was consistent with GATT since it was covered by Article XX, paragraphs (g), (b) and (d), and that the primary nation embargo on offending tuna did not nullify or impair any benefits accruing to the EC or the Netherlands since it did not apply to these countries.	* The Panel found that neither the primary nor the intermediary nation embargo was covered under Article III, that both were contrary to Article XI:1 and not covered by the exceptions in Article XX (b), (g) or (d). * The Panel Report was circulated in 1994 (during the GATT-1947 era), but not adopted.

Table 6 Selected environmental dispute settlement cases (GATT and WTO), continued

Case Detail [a]	Background	Key Panel and Appellate Body Findings
GATT DS 21/R **"US-Tuna" Case** also known as "Tuna-Dolphin" case *:Restriction on Imports of tuna* ***Complainant*** : Mexico ***Respondent*** : United States	The US Marine Mammal Protection Act sets dolphin protection standards for the domestic American fishing fleet and for countries whose fishing boats catch yellowfin tuna in that part of the Pacific Ocean. If a country exporting tuna to the United States cannot prove to US authorities that it meets the dolphin protection standards set out in US law, the US government must embargo all imports of tuna from that country. Mexico was the exporting country concerned, and its exports of tuna to the US were banned. Mexico complained in 1991 under the GATT dispute settlement procedure. The embargo also applies to “intermediary” countries handling the tuna en route from Mexico to the United States. Often the tuna is processed and canned in one of these countries. In this dispute, the “intermediary” countries facing the embargo were Costa Rica, Italy, Japan, Spain, France, the Netherlands Antilles, and the United Kingdom. Others, including Canada, Colombia, the Republic of Korea, and members of the Association of Southeast Asian Nations, were also named as “intermediaries”.	* The Panel found that the import prohibitions under the direct and intermediary embargoes did not constitute internal regulations within the meaning of Article III, were inconsistent with Article XI:1 and were not justified by Article XX paragraphs (b) and (g). Moreover, the intermediary embargo was not justified under either Article XX (b), (d) or (g). But the US could apply its regulations with respect to the quality of tuna imported. This has become known as the “product” versus “process” distinction. "Process" standards violate the GATT; "product" standards do not. * The Panel found that GATT rules did not allow one country to take trade action for the purpose of attempting to enforce its own domestic laws in another country — even to protect animal health or exhaustible natural resources. The term used here is "extra-territoriality". * The Panel Report was circulated in 1991 (during the GATT-1947 era), but not adopted.
GATT DS 10/R (Nov. 1990) **"Thailand-Cigarettes" Case** *:Restrictions on the Importation of and Internal Taxes on Cigarettes* ***Complainant*** : United States ***Respondent*** : Thailand	Under its 1966 Tobacco Act, Thailand prohibited the importation of cigarettes and other tobacco preparations, but authorized the sale of domestic cigarettes; moreover, cigarettes were subject to an excise tax, a business tax and a municipal tax. The US complained that the import restrictions were inconsistent with GATT Article XI:1, and argued that they were justified neither by Article XI:2(c), nor by Article XX(b). The US also argued that the internal taxes were inconsistent with GATT Article III:2.	* The Panel found that the import restrictions were inconsistent with Article XI:1 and not justified under Article X1:2(c). It further concluded that the import restrictions were not “necessary” within the meaning of Article XX(b). The internal taxes were found to be consistent with Article III:2.

Table 6 Selected environmental dispute settlement cases (GATT and WTO), continued

Case Detail [a]	Background	Key Panel and Appellate Body Findings
GATT BISD 35S/98 (Mar. 1988) "Canada-Salmon and Herring" Case *:Measures Affecting Exports of Unprocessed Herring and Salmon* ***Complainant*** : United States ***Respondent*** : Canada	Under the 1976 Canadian Fisheries Act, Canada maintained regulations prohibiting the exportation of certain unprocessed herring and salmon. The US complained that these measures were inconsistent with GATT Article XI. Canada argued that these export restrictions were part of a system of fishery resource management aimed at preserving fish stocks, and therefore were justified under Article XX(g).	* The Panel found that the measures maintained by Canada were contrary to Article XI:1 and were not justified by either Article XI:2(b) or by Article XX(g).
GATT BISD 29S/91 (Feb. 1982) "US-Canadian Tuna" Case *:Prohibition of Imports of Tuna and Tuna Products from Canada* ***Complainant*** : Canada ***Respondent*** : United States	The US implemented an import prohibition on Canadian tuna after Canada seized 19 fishing vessels and arrested US fishermen fishing for albacore tuna, without authorization from the Canadian government, in waters considered by Canada to be under its jurisdiction. The US did not recognize this jurisdiction and introduced the import prohibition to retaliate under the Fishery Conservation and Management Act.	* The Panel found that the US import prohibition was contrary to Article XI:1, and was not justified either under Article XI:2 or under Article XX(g).

a. The date cited in parenthesis is the month and year when either the panel report or the appellate report was adopted.

Source : WTO website (http://www.wto.org/english/tratop_e/envir_e/edis00_e.htm, accessed on January 10, 2008); GATT digital library -Stanford Univ. (http://gatt.stanford.edu/page/home, accessed on Nov. 7, 2007); WTO, "GATT/WTO dispute settlement practice relating to GATT Article XX, paragraphs (b),(d) and (g)", March 8, 2002.