Multilateral Trade Measures in a Post-2012 Climate Change Regime?: What Can Be Taken from the Montreal Protocol and the WTO?

Zhang, ZhongXiang

East-West Center

5 September 2008

The previous version: 5 September 2008
This version: 29 December 2008

Multilateral Trade Measures in a Post-2012 Climate Change Regime?: What Can Be Taken from the Montreal Protocol and the WTO?

ZhongXiang Zhang, *Ph.D in Economics*
张中祥 美国东西方中心研究部资深研究员、经济学博士
Senior Fellow
Research Program
East-West Center
1601 East-West Road
Honolulu, HI 96848-1601
United States
Tel: +1-808-944 7265
Fax: +1-808-944 7298
Email: ZhangZ@EastWestCenter.org

Abstract
The climate-trade nexus gains increasing attention as governments are taking great efforts to forge a post-2012 climate change regime to succeed the Kyoto Protocol. This raises the issues of the scope of trade-related measures and of when and how they could be used. To gain some guidance on the scope of trade provisions in a post-2012 climate regime, this paper first discusses the Montreal Protocol in which such trade provisions have been included. The paper argues that while it is unlikely for developing country parties to agree the inclusion of trade-related measures in a post-2012 climate regime, trade-related measures should, at the very least, be contemplated for a set of industrialized countries (Annex I or II countries) as part of the evolving climate regime. It should be specified how these measures will apply to non-complying parties within this group and when and how unilateral trade measures can be used against countries outside the group. To that end, the paper emphasizes that there is a clear need to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level, as the Lieberman-Warner bill in the U.S. Senate demonstrated great possibility that some industrialized countries, if not all, are considering the term "comparable" as the standard by which to assess the efforts made by their trading partners in order to decide on whether to impose unilateral trade measures on them. While that bill died on the floor of the Senate, this is by no means the end of the prospect for border adjustment type of unilateral trade measures bill. The paper argues that the Lieberman-Warner type of border adjustment bill, in its current form, is likely to face WTO-consistency and methodological challenges. It also holds out more sticks than carrots to developing countries. In order to encourage developing countries to do more to combat climate change, the paper suggests that developed countries should clearly focus

on carrots. Sticks can be incorporated, but only if they are credible and realistic and serve as a useful supplement to push developing countries to take actions or adopt policies and measures earlier than would otherwise have been the case.

JEL classification: F18; Q48; Q54; Q56; Q58

Keywords: Post-Kyoto climate negotiations; Trade-related measures; Developing countries

Dr. ZhongXiang Zhang (张中祥) is a senior fellow at the East-West Center, Honolulu, USA. He is also an affiliate professor of economics at University of Hawaii at Manoa, and an adjunct professor of economics at Chinese Academy of Sciences, Chinese Academy of Social Sciences, and Peking University, Beijing. Currently, he is a co-editor of *International Journal of Ecological Economics & Statistics*, and serves on the editorial boards of seven leading international journals (*Climate Policy; Energy Policy; Energy and Environment; Environmental Science and Policy; International Environmental Agreements; Mitigation and Adaptation Strategies for Global Change; ScientificWorldJournal*). As the author of 160 publications in the fields of energy and environmental economics, trade and the environment, public finance and applied macroeconomic modelling, he authors "*The Economics of Energy Policy in China*" (New Horizons in Environmental Economics Series, Edward Elgar, 1997) and "*Chinese Environmental Policy and Sustainable Development in Asia* (Edward Elgar, 2009), co-authors "*International Rules for Greenhouse Gas Emissions Trading*" (United Nations, 1999), and edits "*An Economic Analysis of Climate Policy"* (Elsevier, 2004), "*Energy Economics and Policy in Mainland China and Taiwan"* (China Environmental Science Press, 2006), "*Trade and the Environment in North America*" (Springer, 2007), "*An Economic Analysis of Climate and Energy Policy* " (Elsevier, 2009), *Services, the Environment and the NAFTA* (Springer, 2009), and "*Asian Energy in the Context of Growing Security and Environmental Concerns*" (Elsevier, 2009). His paper "Estimating the Size of the Potential Market for the Kyoto Flexibility Mechanisms" (*Weltwirtschaftliches Archiv*, Vol. 136, 2000) is among the three most downloaded (since January 1997) in the areas of international trade, environmental economics, and environmental law and policy at Social Science Research Network. Several his publications are reprinted and are used as teaching materials in several American, Chinese and European universities. Eleven of his publications are cited by *IPCC Climate Change 2001: Mitigation* and *IPCC Climate Change 2007: Mitigation of Climate Change*, making him one of the most cited authors in that two extremely comprehensive and authoritative publications on mitigating climate change and the associated costs. His professional services include being requested by Canada's Minister of the Environment to provide inputs to the 2005 United Nations Climate Change Conference; getting involved in a variety of activities with chief climate negotiators from a dozen key countries; serving as an expert/consultant to many national and international organizations; and being frequently invited to give the keynote address at major international conferences in Asia, Europe and North America.

I. Introduction

There is a growing consensus that climate change has the potential to seriously damage our natural environment and affect the global economy and thus represents the world's most pressing long-term threat to future prosperity and security. With greenhouse gas emissions embodied in virtually all products produced and traded in every conceivable economic sector, effectively addressing climate change will require a fundamental transformation of our economy and the ways energy is produced and used. This will certainly have a bearing on world trade because it will affect the costs of production of traded products and therefore their competitive positions in the world market. This climate-trade nexus has become the focus of an academic debate (e.g., Charnovitz, 2003; Zhang, 1998, 2004, 2007; Zhang and Assunção, 2004), and gains increasing attention as governments are taking great efforts to forge a post-2012 climate change regime to succeed the Kyoto Protocol. To level the carbon playing field, such a regime, if effective, will imperatively include the use of trade-related policy tools. The core element of that is trade-related measures in a post-2012 climate change regime. This raises the issues of the scope of such measures and of when and how they could be used.

To examine this issue, this paper first looks at the lesson learned from other multinational environmental agreements, such as the Montreal Protocol in which such trade provisions have been included to see what guidance can be provided. Next, the paper examines whether the condition can be met, provided that a post-2012 climate regime is to incorporate trade provisions as the Montreal Protocol does. The paper also interprets the findings of the WTO panel on the Shrimp-Turtle dispute to infer future WTO panel's stance on trade provisions. On these basis, the paper argues that while it is unlikely for developing country parties to agree the inclusion of trade-related measures in a post-2012 climate regime, trade-related measures should, at the very least, be contemplated for a set of industrialized countries (Annex I or II countries) as part of the evolving climate regime. It should be specified how these measures will apply to non-complying parties within this group and when and how unilateral trade measures can be used against countries outside the group. To that end, the paper emphasizes that there is a clear need to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level, because some industrialized countries, if not all, are considering the term "comparable" as the standard by which to assess the efforts made by their trading partners in order to decide on whether to impose unilateral trade measures on them. Finally, the paper argues that the Lieberman-Warner type of border adjustment bill, in its current form, is likely to face WTO-consistency and methodological challenges. It holds out more sticks than carrots to developing countries. In order to encourage developing countries to do more to combat climate change, developed countries should clearly focus on carrots. Sticks can be incorporated, but only if they are credible and realistic and serve as a useful supplement to push developing countries to take actions or adopt policies and measures earlier than would otherwise have been the case. The paper concludes that at a time when the world community is starting to negotiate a post-Kyoto climate regime, unrealistic border adjustment measures as exemplified in the Lieberman-Warner bill are counter-productive to help to reach such an agreement on comparable climate actions in the post-2012 climate negotiations.

2. Trade measures in the Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer (MP) was signed in 1987 and has since been amended and strengthened in a number of aspects. The MP uses trade measures as one enforcement mechanism among several policy instruments in achieving its aim of protecting the ozone layer. Parties to the treaty are required to ban trading with non-parties in ozone-depleting substances (ODS), such as CFCs, in products containing them, such as refrigerators, and potentially, in products made with but not containing CFCs, such as electronic components. The last provision has not yet been implemented primarily because of problems of detection, and also because of the small volumes of CFCs involved. These trade measures have been gradually extended to all the categories of ozone-depleting substances covered by the MP. Moreover, the MP has included the provision that exempts non-parties from trade measures if they are determined by the parties to be in compliance with the phase-out schedules. So, the offsetting trade measures are based on legitimate environmental objective and not merely on formal membership of an international agreement (Brack, 1996; Zhang, 1998).

More importantly, these trade measures are accompanied with finance and technology transfer mechanisms. Under the MP, the Multilateral Fund for the Implementation of the Montreal Protocol was established in 1990 to meet the incremental costs of developing country parties (the so-called Article 5 countries) in complying with the MP requirements. Since its operation in 1991, the Multilateral Fund has received contributions totaling over US$ 2.3 billion from 49 industrialized countries and supported about 5,700 projects and activities in 146 developing countries. The implementation of these projects will result in the phase-out of the consumption of more than 249,577 ODP tonnes and the production of about 174,206 tonnes of ozone depleting substances. As a result, developing countries are no worse off as parties than they are as non-parties. The MP is now 20-year old with 191 Parties. It has achieved 95% of its objective of phasing out the ODS and put the ozone layer on a path to recovery.[1] Accompanied with this effective financial mechanism, the first of its kind from an international treaty, the MP trade measures have in fact hardly ever been used, because almost every country is now a party to the treaty.

Lesson learned from the MP: trade measures can be incorporated in multilateral environmental agreements (MEAs) and work effectively in practice only if they are accompanied with effective finance and technology transfer mechanisms.

3. Funding from the Climate Convention and its financial mechanism

The lesion from the MP suggests that the funding level of finance mechanism is crucial if a post-2012 climate regime is to incorporate trade provisions as the Montreal Protocol does. The Kyoto Protocol (KP) establishes a clean development mechanism (CDM). It serves as a channel to provide finance and technology transfer to developing countries. The CDM market increased from 563 million tons of certified emission reductions

[1] See the Multilateral Fund web site at: http://www.multilateralfund.org (accessed on August 29, 2008).

(CERs) and €3.9 billion in 2006 to 947 million tons of CERs and €12 billion in 2007. The astonishing increase in value terms is due mainly to dramatic growth in the secondary market with about 300 million CERs traded over the course of 2007 (Point Carbon, 2008). While the CDM has emerged as a financing mechanism to mitigate greenhouse gas emissions as the implementation of CDM projects has progressed, it still does not work to full potential scale. To that end, change needs to take place both at national and international levels. At the national level, for those developing countries that have not truly benefited from the CDM, they need to put in place clear institutional structures, streamlined and transparent CDM procedures and sound governance of clearer lines of responsibility and functions to facilitate the smooth implementation of CDM projects in their countries. At the international level, post-Kyoto climate negotiations need to reform the CDM to overcome its current structural limitations and to make it accommodate those players and types of small projects that have been left out to date. When taken together and combined, they will help to expand the number and geographical reach of the CDM, thus spreading its benefits to more countries (Zhang, 2008a). Nevertheless, markets cannot deliver miracles. Market instruments like CDM, as useful as it may be, must therefore be complemented with traditional fund solutions that provide a stable source of funding.

Can the funds established within the climate regime deliver as the Multilateral Fund under the MP did? The Special Climate Change Fund and the Least Developed Countries Fund are established under the United Nations Framework Convention on Climate Change (UNFCCC). As of October 2, 2008, the total pledged for these two funds (cumulatively, not per year) is US$279 million (Table 1). The only fund under the KP is the Adaptation Fund. The level of its funding depends on the quantity of CERs issued and their prices. Assuming annual sales of 300-450 million tons of CERs and a market price of US$24 per ton of CERs, the Adaptation Fund would receive US$80-300 million per year for the period 2008-2012 (UNFCCC, 2007). The Global Environment Facility (GEF) as an entity operating the financial mechanism of the UNFCCC has targeted the amount of US$950 from its fourth replenishment at climate change projects over the period 2006-2010. Combined together, **the pledges and contributions from all these three funds and the GEF Trust Fund are well below US$1 billion a year.**

Table 1 The Amount of Pledges and Contributions from the Multilateral Financial Mechanisms under the Framework Convention and its Kyoto Protocol

Sources	Amount (million US$)
Special Climate Change Fund	106.57 (pledged)
Least Developed Countries Fund	172.44 (pledged)
Adaptation Fund	80-300 per year (estimated)
Global Environment Facility Trust Fund (allocated to climate change focal area)	950 (targeted for 2006-2010)

Sources: Global Environment Facility (2008a); UNFCCC (2007).

By contrast, according to the Stern Review (Stern, 2007), the incremental costs of low carbon investments in developing countries are likely to be at least US$20-30 billion a year. This is a very conservative estimate. The UNFCCC (2007) Secretariat puts the investment estimates for climate change adaptation in developing countries in the range of US$28-67 billion a year. On mitigation, the UNFCCC (2007) Secretariat estimates the investment of US$76 billion needed in developing countries a year.[2] So, developing countries will need the investment of at least US$100 billion in climate change mitigation and adaptation. However, **the contributions from all these three funds and the GEF Trust Fund only amount to less than one percent of the anticipated needs from developing countries.** This suggests that the ratio of the combined pledged funding from the funds to the required investment at 1:100.

Table 2 GEF Trust Fund Allocations and Co-financing in the Climate Change Focal Area

GEF Phase	GEF Grant (million US$)	Co-financing (million US$
Pilot phase (1991-1994)	284.80	2402.89
GEF 1 (1994-1998)	510.36	2322.10
GEF 2 (1998-2002)	681.07	3403.40
GEF 3 (2002-2006)	877.72	4810.56
GEF 4 (2006-2010)	950.00 (targeted)	
2007	76.35	1651.82
2008	138.45	1119.46
2009	88.26	514.04
Total	2657.01	16224.28

Source: Global Environment Facility (2008b).

The value of a single multilateral fund lies in its ability to leverage contributions from a range of other donors. Can these funds leverage co-financing from other sources to close this financing gap? Let's look at the recent record of leverage of multilateral funding. Since 1990, the World Bank Group commitments to renewable energy and efficiency have exceeded US$10 billion, with each dollar leveraging another three dollars from other private and public sources (Cundy, 2006). The GEF as an entity operating the financial mechanism of the UNFCCC, since its inception in 1991, has provided $8.26 billion in grants and generated over $33.7 billion in co-financing from other sources to support over 2,200 projects that produce global environmental benefits in 165 developing countries and countries with economies in transition.[3] As indicated in Table 2, in the

[2] The estimates vary. The World Bank (2006) estimates the incremental, upfront capital costs of US$30 billion per year to decarbonize the power sector in developing countries alone.

[3] See "The About GEF" at the GEF web site at: http://www.thegef.org/interior.aspx?id=50 (accessed on November 14, 2008).

focal area of climate change, as at November 2008, the GEF has allocated since its inception a total of US$2.66 billion from the GEF Trust Fund. This GEF funding has leveraged a co-financing in excess of US$16.22 billion. This suggests that the GEF enjoys an average leverage ratio of 4.1 in the all six focal areas and 6.1 in the climate change focal area, meaning that each dollar of the GEF grant leverages US$4.1-6.1 from other sources. Assuming the leverage ratio of 6 and the minimum requirement of US$100 billion per year, then the current commitments are only able to bring the total finance value to US$7 billion and leave the financing gap of US$93 billion per year. To close this gap, we need to increase the multilateral funding and enhance its leverage ability. Assuming the leverage ratio of 10, which has not experienced over the long time horizon for multibillion public funding, and the minimum requirement of US$100 billion per year, then the multilateral funding needs to be increased to US$10 billion per year to meet developing country needs for climate change mitigation and adaptation.

If the funding available under the financial mechanism of the UNFCCC remains at its current level and continues to rely mainly on voluntary contributions, it will not be sufficient to address the future financial flows estimated to be needed for climate change mitigation and adaptation in developing countries. **If a success of the Montreal Protocol could be considered as some kind of predictor for a post-2012 climate regime, the combined pledged funding and contribution from the funds under the UNFCCC and the GEF and estimated funding from the fund under its KP are nowhere near to make trade measures work effectively, not to mention whether they can be incorporated in a post-2012 climate regime in the first place.**

4. The findings of WTO Appellate Body in the Shrimp-Turtle dispute

The WTO Appellate Body decisions on the Shrimp-Turtle dispute have been interpreted as implicitly permitting trade measures pursued through MEAs. To address the decline of sea turtles around the world, in 1989 the U.S. Congress enacted Section 609 of Public Law 101-162 to authorize embargoes on shrimp harvested with commercial fishing technology harmful to sea turtles. The U.S. was challenged in the WTO by India, Malaysia, Pakistan and Thailand in October 1996, after embargoes were leveled against them. The four governments challenged this measure, asserting that the U.S. could not apply its laws to foreign process and production methods. A WTO Dispute Settlement Panel was established in April 1997 to hear the case. The Panel found that the U.S. failed to approach the complainant nations in serious multilateral negotiations before enforcing the U.S. law against those nations. The Panel held that the U.S. shrimp embargo was a class of measures of processes-and-production-methods type and had a serious threat to the multilateral trading system because it conditioned market access on the conservation policies of foreign countries. Thus, it cannot be justified under GATT Article XX. However, the WTO Appellate Body overruled the Panel's reasoning. The Appellate Body held that a WTO member requires from exporting countries compliance, or adoption of, certain policies prescribed by the importing country does not render the measure inconsistent with the WTO obligation. Although the Appellate Body still found that the U.S. shrimp embargo was not justified under GATT Article XX, the decision was not on ground that the U.S. sea turtle law itself was not inconsistent with GATT. Rather, the

ruling was on ground that the application of the law constituted "arbitrary and unjustifiable discrimination" between WTO members (WTO, 1998). The WTO Appellate Body pointed to a 1996 regional agreement reached at the U.S. initiation, namely the Inter-American Convention on Protection and Conservation of Sea Turtles, as evidence of the feasibility of such an approach (WTO, 1998; Berger, 1999). Here, the Appellate Body again advanced the standing of multilateral environmental treaties (Zhang, 2004; Zhang and Assunção, 2004). Thus, it follows that this trade dispute under the WTO may have been interpreted as a clear preference for actions taken pursuant to multilateral agreements and/or negotiated through international cooperative arrangements, such as the Kyoto Protocol and its successor. However, this interpretation should be with great caution, because there is no doctrine of *stare decisis* (namely, "to stand by things decided") in the WTO; the GATT/WTO panels are not bound by previous panel decisions (Zhang and Assunção, 2004).

5. What can be taken from the MP and the findings of WTO Appellate Body in the Shrimp-Turtle dispute?

The lesson from the MP suggests that trade measures can be incorporated in MEAs and work effectively in practice only if they are accompanied with effective finance and technology transfer mechanisms. However, given that the combined pledged funding from the funds under the Climate Convention and its Kyoto Protocol and from its financial mechanism is far from the anticipated needs from developing countries, it is unlikely for developing country parties to agree the inclusion of trade-related measures against them in a post-2012 climate regime in the first place. Moreover, even if they were incorporated, they will not work.

However, as part of the evolving climate regime, trade-related measures should, at the very least, be contemplated for a set of industrialized countries (Annex I or II countries). It should be specified how these measures will apply to non-complying parties within this group and when and how unilateral trade measures can be used against countries outside the group. On the one hand, current articles on climate-trade linkages under the UNFCCC and its Kyoto Protocol are too general to hardly be of practical use. On the other hand, the Bali Action Plan calls for "comparability of efforts" towards climate mitigation actions only among industrialized countries. However, lack of the clearly defined notion on what is comparable has led to diverse interpretations of the concept of comparability. Some industrialized countries have also extended the scope of its application beyond industrialized countries themselves, attempting to impose unilateral trade measures against other trading partners to address its competitiveness concerns. Such lack of the common understanding will lead one country to define whether other countries have made comparative efforts to its own. This can hardly be objective, and in turn leads one country to misuse unilateral trade measures against other trading partners to address its competitiveness concerns. Therefore, there is a clear need to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level, taking into account differences in their national circumstances, such as current level of development, per capita GDP, current and historical emissions, emission intensity, and per capita emissions. If well defined, that

will provide some reference to WTO panels in examining cases related to comparability issues. Let's take a hypothetical case. Suppose that a country imposes unilateral trade measures against its trading partners on the comparability ground but does not follow the internationally agreed notion, its trading partners might choose to challenge that country before WTO. A case like this is likely, given that both the top Chinese official in charge of climate issue and the Brazilian lead climate ambassador consider the WTO as the proper forum when developing countries are required to purchase allowances in the proposed U.S. cap-and-trade regime (Samuelsohn, 2007). If a case like this really happens before a WTO panel, that panel would likely look to the practice in the existing climate regime to assess whether that country has followed the international standard when determining comparability. Otherwise, that WTO panel will have no choice but to fall back on the aforementioned Shrimp-Turtle jurisprudence, and would be influenced by the fear of the political fall out from overturning U.S. unilateral trade measures in its domestic climate legislation (Werksman, 2008).

6. How far can developing country commitments go in an immediate post-2012 climate regime?[4]

The U.S. commitments at Kyoto and diplomatic and public pressure on China had put great pressure on China to take on some kind of commitments. Under these circumstances and in expectation that the U.S. would take on more stringent commitments subsequent to the first compliance period (namely, far below its 1990 level), I envisioned a decade ago the following six proposals that could be put on the table as China's plausible negotiation position, which is each described in ascending order of stringency (Zhang, 2000).[5]

"**First**, China could regard its active participation in CDM as 'meaningful participation'.

Second, just as Article 3.2 of the Kyoto Protocol requires Annex I countries to 'have made demonstrable progress' in achieving their commitments by 2005, China could commit to demonstrable efforts towards slowing its greenhouse gas emissions growth at some point between the first commitment period and 2020. Securing the undefined "demonstrable progress" regarding China's efforts is the best option that China should fight for at the international climate change negotiations subsequent to Buenos Aires.

Third, if the above commitment is not considered 'meaningful', China could make voluntary commitments to specific policies and measures to limit greenhouse gas emissions at some point between the first commitment period and 2020. Policies and measures might need to be developed to explicitly demonstrate whether or not China has made adequate efforts. Such policies and measures might include abolishing energy

[4] This section draws heavily on Zhang (2000 and 2008b,c).

[5] Zhang (2000) was originally prepared for the United Nations Development Programme in 1998. When the draft of that paper was ready, the Washington DC-based Resources for the Future made a press release titled "Is China Taking Actions to Limit Its Greenhouse Gas Emissions?", September 15, 1998.

subsidies, improving the efficiency of energy use, promoting renewable energies, and increasing the R&D spending on developing environmentally sound coal technologies.

Fourth, China could make a voluntary commitment to total energy consumption or total greenhouse gas emissions per unit of GDP at some point around or beyond 2020. In my view, carbon intensity of the economy is preferred to energy intensity of the economy (i.e., total energy consumption per unit of GDP) because all the efforts towards shifting away from high-carbon energy are awarded by the former…

The fifth option would be for China to voluntarily commit to an emissions cap on a particular sector at some point around or beyond 2020. Taking on such a commitment, although already burdensome for China, could raise the concern about the carbon leakage from the sector to those sectors whose emissions are not capped.

This leads to **the final option** that China could offer: a combination of a targeted carbon intensity level with an emissions cap on a particular sector at some point around or beyond 2020. This is the bottom line: China cannot afford to go beyond it until its per capita income catches up with the level of middle-developed countries."

It looked like China would be pressured to take on commitments at much earlier date than what China wished. This situation has changed once the U.S. withdrew from the Kyoto Protocol. A decade later, we see that the carbon intensity and sectoral approaches-based commitments, which were discussed in the academic literature ten years ago, are formally incorporated into the Bali roadmap that aims to reach an agreement to the successor to the Kyoto Protocol, with a clear deadline for the conclusion by 2009. This is a very positive development, and clearly indicates the policy relevance of the once-sound-theoretical ideas. However, I really doubt that developing countries may go beyond the aforementioned third option between 2013 and 2020 for several reasons.

First, given the very short timeframe to conclude the negotiations, in all likelihood, it would be impossible to reach the necessary agreement on the rules, countries and sectors covered and the levels of ambitions for developing countries, especially due to the amount of the data that would be required. As it has been indicated by the Asian-Pacific Economic Cooperation (APEC) Leaders Summit in September 2007, setting a carbon intensity target, even if it is not binding, is not that easy. Australia, the host country, proposed that all 21 APEC economies, regardless of whether they are developed and developing economies, agree to reduce energy intensity by at least 25% by 2030, but in the end the leaders only agreed to work towards achieving an *APEC-wide* (emphasis added) aspirational goal in energy intensity by at least 25% by 2030, relative to 2005 levels. This should not come as a surprise because energy use per unit of GDP, a key indicator of patterns of energy use, is still high in many developing Asian countries, and even increased in countries such as Brunei, the Philippines, Malaysia, South Korean and Thailand between 1990 and 2004. Indonesia and Pakistan consumed almost the same amount of energy per unit of GDP as they were in 1990 (Figure 1). Even the rate of energy efficiency improvement in IEA countries has been less than 1% per year since 1990 – much lower than in previous decades.

Second, it is inconceivable that developing countries would ever go beyond the aforementioned third option between 2013 and 2020 without an effective financial mechanism. Market instruments like CDM, as useful as it may be, must be complemented with traditional fund solutions that provide a stable source of funding. However, the pledged funding from the funds under the Climate Convention and its Kyoto Protocol and from its financial mechanism are far from the anticipated needs from developing countries. Unless this funding situation changes significantly, which is most unlikely to happen, developing countries cannot afford to make commitments beyond the third option above-envisioned a decade ago.

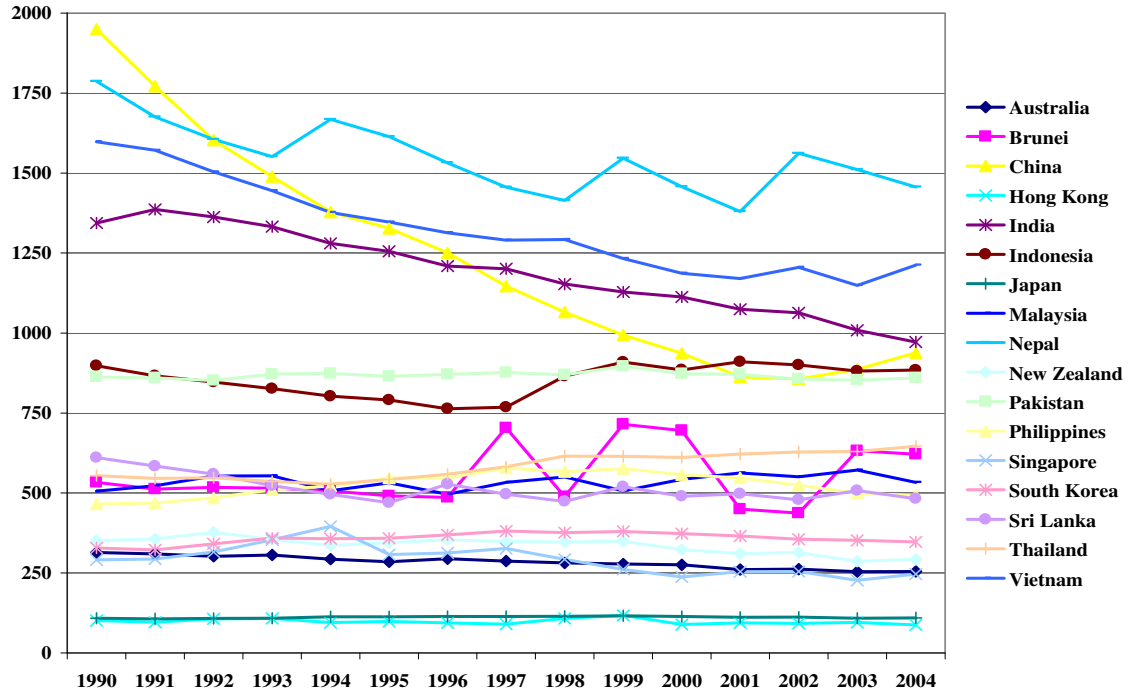

Figure 1. Energy use per unit of GDP in the selected Asia Pacific countries, 1990-2004 (Tons of oil equivalent/million 2000 US$).
Source: Zhang (2008a).

Third, the U.S. factor will continue to play a role in affecting developing country's willingness to take on commitments and the stringency of that commitments. Let's look at the Lieberman-Warner Climate Security Act of 2008 (S.3036), the most detailed bipartisan bill to date to require domestic, mandatory and economy-wide GHG emissions reductions in the U.S. beginning January 1, 2012. On June 6, 2008, the U.S. Senate debated and held votes on this bill. While it failed to secure the 60 votes needed to close debate on the bill and move to a final vote (i.e., to "invoke cloture"), the bill has made more headway than any of its precursors because it was the first time that a GHG cap-and-trade bill had ever come to the floor of the U.S. Senate through regular order—that is, having been debated and voted out of a committee. Both the presidential candidates John McCain and Barack Obama supported the bill in the Senate, and President-elect Obama reiterated his campaign promise of a system to cap and trade greenhouse gas emissions in

the U.S..Therefore, this Act is likely to serve as a template for any future bill. Under the Act, 87% of the U.S. GHG emissions are estimated to be subject to the emission caps that are set 19% below the 2005 level by 2020 (Pew Center on Global Climate Change, 2008). However, the U.S. GHG emissions were 16.8% higher in 2005 than that in 1990 (EIA, 2007), and not all emission sources are capped under the Act. As a result, even if the Act becomes law, the U.S. GHG emissions in 2020 are probably still above its 1990 level. From a U.S perspective, that emission reduction would appear quite ambitious and require serious actions and investment, but is still far short of a 7% reduction of the U.S. GHG emissions during the period 2008-2012 required by the Kyoto Protocol and 25-40% by 2020 suggested by the IPCC and demanded by developing countries. In expectation that the U.S. would take on the more stringent commitments subsequent to the first compliance period (namely, far below its 1990 level), I envisioned a decade ago that developing countries may go beyond the aforementioned third option. However, the U.S. emissions in 2020 are at best kept at its 1990 level as estimated under the Lieberman-Warner Climate Security Act. This is far from the point where it is likely that developing country would do that.

7. Encouraging developing countries to do more: carrots, sticks or both?

Understandably, the U.S. and other industrialized countries would like to see developing countries, in particular large developing economies, go beyond that because of concerns about their own competitiveness and growing greenhouse gas emissions in developing countries. They are considering unilateral trade measures to "induce" developing countries to do so. WTO members have rights to do that because they are free to unilaterally decide what measures to take and under what conditions. But once they have made such a choice, then and only then the WTO rules apply. For example, a variety of measures have been put forward for the U.S. legislators to consider, falling into the three broad categories: border adjustments, performance standards and carbon market design (Subcommittee on Energy and Air Quality of the U.S. House of Representatives, 2008). To date, there is a considerable disagreement as to what measures would be most likely to pass muster under the WTO. Therefore, from the perspective of WTO consistency, industrialized countries need to focus on carrots, assisted with sticks (e.g., border adjustments and similar trade-related measures, conditions on access to carbon markets), as a means of encouraging developing countries to do more domestically than what are internationally agreed on. The Montreal Protocol clearly demonstrates that a carrot (finance assistance and technology transfer) assisted with stick (trade restrictions) approach works effectively in achieving its legitimate environmental objective.

However, measures as proposed in the Lieberman-Warner Climate Security Act of 2008 hold out more sticks than carrots to developing countries. A proposal by the International Brotherhood of Electrical Workers (IBEW) and American Electric Power (AEP) requires importers to obtain emission allowances to cover the carbon content of certain products from countries that do not take climate actions comparable to that of the U.S. (Morris and Hill, 2007). Its original version had already incorporated this mechanism, threatening to punish energy-intensive imports from developing countries by requiring importers to obtain emission allowance, but only if they had not taken comparable actions by 2020,

eight years after the effective date of a U.S. cap-and-trade regime begins. The inclusion of trade provisions would give the U.S. additional diplomatic leverage to negotiate multilaterally and bilaterally with other countries on comparable climate actions. Should such negotiations not succeed, such trade provisions would provide a means of leveling the carbon playing field between American energy-intensive manufacturers with their competitors in countries not taking comparable climate actions.

It should be emphasized that the aim to include trade provisions is to facilitate negotiations while keeping the possibility to invoke that option as a last resort. The current version has brought the deadline forward to 2014 to gain business and union backing.[6] While the inclusion of trade provisions might be considered the "price" for passing any U.S. legislation capping its greenhouse gas emissions (put another way, no such a legislation can move forward through the Congress without dealing with the issue of trade provisions), significantly moving forward the imposition of allowance requirements to U.S. imports is rather unrealistic, given the already very short grace period ending 2019 in its original version. Notice that the Montreal Protocol on Substances that Deplete the Ozone Layer grants developing countries a grace period of 10 years (Zhang, 2000). Given that the scope of economic activities affected by a climate regime is several orders of magnitude larger than those covered by the Montreal Protocol, if legislation incorporates border adjustment measures (put the issue of their WTO consistency aside), in my view, they should not be invoked at least 10 years after mandatory U.S. emission targets take effect. Moreover, unrealistically shortening the grace period to resort to the trade provisions would increase uncertainty to withstand a challenge by U.S. trading partners before WTO, because, as the Shrimp-Turtle dispute indicates, the WTO consistency argues for a period of good faith efforts to reach agreements among the countries concerned before imposing such trade measures. Put another way, trade provisions should be preceded by major efforts to negotiate with partners within a reasonable timeframe.

The WTO consistency also argues for whether there is alternative to trade provisions for the same function. As the Thai cigarette dispute indicates, the GATT Dispute Settlement Panel concluded that Thailand had legitimate concerns with health but it had GATT-consistent weapons available to it, e.g. bans on advertising, other than a trade ban (GATT, 1990). Indeed, there is alternative to resort to trade provisions too quickly to protect the U.S. trade-sensitive, energy-industries during a period when the U.S. is taking good faith efforts to negotiate with trading partners on comparable actions. One way to address competiveness concerns is to allocate emission allowances to those sectors vulnerable to global competition in the initial allocation of emission allowances. Bovenberg and Goulder (2002) found that giving out about 13% of the allowances to fossil fuel suppliers freely instead of auctioning in an emissions trading scheme in the U.S. would be sufficient to prevent their profits with the emissions constraints from falling in comparison with those without the emissions constraints.

[6] This is in line with the IBEW/AEP proposal, which requires U.S. importers to submit allowances to cover the emissions produced during the manufacturing of those goods two years after U.S. starts its trade-and-cap program (McBroom, 2008).

To pass WTO scrutiny of trade provisions, the U.S. is likely to make reference to the health and environmental exceptions provided under GATT Article XX. This Article itself is the exceptions that authorize governments to employ otherwise GATT-illegal measures when such measures are necessary to deal with certain enumerated social policy problems. The GATT panel in Tuna/Dolphin II concluded that Article XX does not preclude governments from pursuing environmental concerns outside their national territory, but such extra-jurisdictional application of domestic laws would be permitted only if aimed *primarily* (emphasis added) at having a conservation or protection effect (Zhang, 1998). If trade provisions were mainly for protecting the environment by requiring other countries to take actions comparable to that of the U.S., then it is debatable to mandate importers to purchase allowances from the designated special international allowance pool to cover the carbon emissions associated with the manufacture of that product. To increase the prospects for a successful WTO defense, I think that trade provisions can refer to the designated special international allowance pool, but may not do without adding "or equivalent". This will allow importers to submit equivalent emission reduction units that are recognized by international treaties to cover the carbon contents of imported products.

Besides, there will be methodologically challenging in implementing trade provisions. To put WTO consistency of such border adjustment aside, there would be formidable technical difficulties in identifying the appropriate carbon contents embodied in traded products, given the wide range of technologies in use around the world and very different energy resource endowments and consumption patterns among countries. In the absence of any information regarding the carbon content of the products from exporting countries, importing countries, the U.S. in this case, could, for instance, prescribe the tax rates based on their domestically predominant method of production for the imported products (Zhang, 1998; Zhang and Assunção, 2004). This practice is by no means without foundation. For example, the U.S. Secretary of the Treasury has adopted the approach in the tax on imported toxic chemicals under the Superfund Tax (Poterba and Rotemberg, 1995; Hoerner, 1998). To be more defensible, it should allow foreign producers to challenge the carbon contents applied to their products to ensure that they will not pay for more than they could have actually been emitted.

Not only has the bill imposed an import allowance purchase requirement too quickly, it has also dramatically expanded the scope of punishment: almost any manufactured product would now qualify. If strictly implemented, this will pose an impossibly high hurdle for developing countries (The Economist, 2008).

8. Conclusions

Governments are taking great efforts to forge an agreement on comparable climate actions in the post-2012 climate negotiations. Aimed at leveling the carbon playing field, the inclusion of trade-related provisions is considered useful in both facilitating to reach such an agreement and effectively implementing it, once reached.

To gain some guidance on the scope of trade provisions in a post-2012 climate regime, this paper first discusses the Montreal Protocol in which such trade provisions have been included. The lesson from the Montreal Protocol suggests that trade measures can be incorporated in multilateral environmental agreements and work effectively in practice only if they are accompanied with effective finance and technology transfer mechanisms. This lesson, combined with the fact the combined pledged funding from the funds under the Climate Convention and its Kyoto Protocol and from its financial mechanism is far from the anticipated needs from developing countries, suggests that developing country parties are unlikely to agree the inclusion of trade-related measures against them in a post-2012 climate regime.

In the meantime, the paper argues that trade-related measures should, at the very least, be contemplated for a set of industrialized countries (Annex I or II countries) as part of the evolving climate regime at least on two grounds. First, the Shrimp-Turtle dispute under the WTO may have been interpreted as a clear preference for actions taken pursuant to multilateral agreements and/or negotiated through international cooperative arrangements. Second, there is a clear need to define comparable efforts towards climate mitigation and adaptation to discipline the use of unilateral trade measures at the international level. The Bali Action Plan calls for "comparability of efforts" towards climate mitigation actions. However, some industrialized countries, if not all, are considering the term "comparable" as the standard by which to assess the efforts made by their trading partners in order to decide on whether to impose unilateral trade measures on them. This is not hypothetical. Rather, it is very real as the Lieberman-Warner bill in the U.S. Senate demonstrated. While that bill died on the floor of the Senate, this is by no means the end of the prospect for border adjustment type of unilateral trade measures bill, given that the inclusion of such trade provisions might be considered the "price" for passing any U.S. legislation capping its greenhouse gas emissions. In addition to methodologically challenging in implementing the Lieberman-Warner type of border adjustment bill, the paper argues that that type of border adjustment bill is likely to face WTO-consistency challenge. To increase the prospects for a successful WTO defense, there should be a period of good faith efforts to reach agreements among the countries concerned before imposing such trade measures. Put another way, trade provisions should be preceded by major efforts to negotiate with partners within a reasonable timeframe. As the Thai cigarette dispute indicates, the WTO consistency also argues for an alternative to trade provisions for the same function. Moreover, the paper suggests that trade provisions can refer to the designated special international allowance pool, but may not do without adding "or equivalent". This will allow importers to submit equivalent emission reduction units that are recognized by international treaties to cover the carbon contents of imported products.

It should be emphasized that the Lieberman-Warner type of border adjustment bill holds out more sticks than carrots to developing countries. If the U.S. and other industrialized countries really want to persuade developing countries to do more to combat climate change, they should first reflect why developing countries are unwilling to, and cannot afford to go beyond the aforementioned third option in the first place. That will require industrialized countries to seriously take developing country's legitimate demand that industrialized countries need to demonstrate that they have taken the lead in reducing

their own greenhouse gas emissions, provide significant funding to support developing country's climate change mitigation and adaptation efforts and to transfer low or zero carbon emission technologies at an affordable price to developing countries. Industrialized countries need to provide positive incentives to encourage developing countries to do more. Carrots should serve as the main means. Sticks can be incorporated, but only if they are credible and realistic and serve as a useful supplement to push developing countries to take actions or adopt policies and measures earlier than would otherwise have been the case. At a time when the world community is starting to negotiate a post-Kyoto climate regime, unrealistic border adjustment measures as exemplified in the Lieberman-Warner bill are counter-productive to help to reach such an agreement on comparable climate actions in the post-2012 climate negotiations.

Acknowledgments
An earlier version of this paper was presented at the International Workshop on Post-2012 Climate and Trade Policies, organized by the United Nations Environment Programme and the EU-Funded ADAM Project, Geneva, Switzerland, September 8-9, 2008. It has benefited from useful discussions with the organizers of and participants in that workshop. That said, the views expressed here are those of the author. The author bears sole responsibility for any errors and omissions that may remain.

References

Bovenberg, A.L. and L.H. Goulder (2002), Addressing Industry-Distributional Concerns in U.S. Climate Change Policy, Unpublished manuscript, Department of Economics, Stanford University.

Brack, D. (1996), *International Trade and the Montreal Protocol*, The Royal Institute of International Affairs and Earthscan, London.

Charnovitz, S. (2003), Trade and Climate: Potential Conflicts and Synergies, in Pew Center on Global Climate Change*, Beyond Kyoto – Advancing the International Effort Against Climate Change*, pp. 141-170.

Cundy, C. (2006), World Bank Raises Spending, Exceeds Target, on Renewables, *Environmental Finance,* Vol. 7, No. 10, September, p. 14.

EIA (2007), Emissions of Greenhouse Gases in the United States 2006, DOE/EIA-0573(2006), U.S. Energy Information Administration (EIA), Washington, DC, November, Available at: http://www.eia.doe.gov/oiaf/1605/ggrpt/pdf/0573(2006).pdf.

General Agreement on Tariffs and Trade (GATT, 1990), Thailand – Restrictions on Importations of and Internal Taxes on Cigarettes, Report of the Panel, DS10/R, October 5.

Global Environment Facility (2008a), Status Report on the Climate Change Funds October 2008 (Report from the Trustee), GEF/LDCF.SCCF.5/Inf.2, Washington, DC, November 7, Available at: http://www.thegef.org/uploadedFiles/Documents/LDCFSCCF_Council_Documents/LDCFSCCF5_November_2008/LDCF.SCCF.5.Inf.2%20Status%20Report%20on%20the%20Climate%20Change%20Funds.pdf.

Global Environment Facility (2008b), Work Program Submitted for GEF Council Approval, GEF/C.34/6, Washington, DC, October 14, Available at: http://www.thegef.org/uploadedFiles/Documents/Council_Documents__(PDF_DOC)/GEF_C34/C.34.6%20Work%20Program%20Cover%20Note(1).pdf.

Hoerner, J.A. (1998), The Role of Border Tax Adjustments in Environmental Taxation: Theory and U.S. Experience, Presented at the International Workshop on Market-based Instruments and International Trade, Amsterdam, 19-20 March.

McBroom, M. (2008), How the IBEW-UWM-Boilermakers-AEP International Proposal Operates within Climate Legislation, June 17, Available at: http://www.wita.org/index.php?tg=fileman&idx=viewfile&idf=189&id=4&gr=Y&path=&file=WITA-+Climate+Change+-+Overview+of+IBEW-AEP+Proposal+(June+17%2C+2008).pdf.

Morris, M.G. and E.D. Hill (2007), Trade is the Key to Climate Change, *The Energy Daily*, Vol. 35, No. 33, February 20.

Pew Center on Global Climate Change (2008), Summary of the Boxer Substitute Amendment to the Lieberman-Warner Climate Security Act, June 4, Available at: http://www.pewclimate.org/docUploads/L-WFullSummary.pdf.

Point Carbon (2008), Carbon 2008: Post-2012 Is Now, Norway, March 11.

Poterba, J.M. and J.J. Rotemberg (1995), Environmental Taxes on Intermediate and Final Goods When Both Can Be Imported, *International Tax and Public Finance*, Vol. 2, pp. 221-228.

Samuelsohn, D. (2007), Trade Plan Opposed by China, Brazil and Mexico, *Greenwire,* September 26, Available at: http://www.earthportal.org/news/?p=507.

Stern, N. (2007), *Stern Review on the Economics of Climate Change*, Cambridge University Press, Available at: http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.

Subcommittee on Energy and Air Quality of the U.S. House of Representatives (2008), Competitiveness Concerns/Engaging Developing Countries, Climate Change Legislation Design White Paper, Washington DC, January, Available at:

http://energycommerce.house.gov/Climate_Change/White_Paper.competitiveness.013108.pdf.

The Economist (2008), Pollution Law: Trading Dirt, June 7, pp. 42-44.

The World Bank (2006), An Investment Framework for Clean Energy and Development: A Progress Report, Background Paper for the Development Committee Meeting on September 18, Washington DC.

UNFCCC Secretariat (2007), Report on Analysis of Existing and Potential Investment and Financial Flows Relevant to the Development of an Effective and Appropriate International Response to the Climate Change, Dialogue Working Paper No. 8, Prepared for the Fourth Workshop under the Dialogue on Long-Term Cooperative Action to Address Climate Change by Enhancing Implementation of The Convention, August 27-29, Vienna, Available at: http://unfccc.int/files/cooperation_and_support/financial_mechanism/financial_mechanism_gef/application/pdf/dialogue_working_paper_8.pdf.

Werksman, J. (2008), Reflecting Trade Related Measures in a Post-2012 Agreement: Comparing the Incomparable, Presented at the UNEP/ADAM International Workshop on Post-2012 Climate and Trade Policies, Geneva, Switzerland, September 8-9.

Zhang, Z.X. (1998), Greenhouse Gas Emissions Trading and the World Trading System, *Journal of World Trade*, Vol. 32, No. 5, pp. 219-239.

Zhang, Z.X. (2000), Can China Afford to Commit itself an Emissions Cap? An Economic and Political Analysis, *Energy Economics*, Vol. 22, No. 6, pp. 587-614.

Zhang, Z.X. (2004), Open Trade with the U.S. without Compromising Canada's Ability to Comply with its Kyoto Target, *Journal of World Trade,* Vol. 38, No. 1, pp. 155-182.

Zhang, Z.X. (2007), Doing Trade and Climate Policy Together, in Najam, A., Halle, M. and R. Meléndez-Ortiz (editors), *Trade and Environment: A Resource Book*, International Institute for Sustainable Development, Canada, and International Center for Trade and Sustainable Development, Geneva, pp. 61-62.

Zhang, Z.X. (2008a), Asian Energy and Environmental Policy: Promoting Growth While Preserving the Environment, *Energy Policy*, Vol. 36, No. 10, pp. 3905-3924.

Zhang, Z.X. (2008b), Is China a Christmas Tree to Hang Everybody's Complaints? Putting its Own Energy-Saving into Perspective, The Plenary Address at the 31st International Association for Energy Economics International Conference, Istanbul, Turkey, June 18, Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1285618.

Zhang, Z.X. (2008c), How Far Can Developing Country Commitments Go in an Immediate Post-2012 Climate Regime?, Social Science Research Network Working Paper, Available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1292050.

Zhang, Z.X. and L. Assunção (2004), Domestic Climate Policy and the WTO, *The World Economy*, Vol. 27, No. 3, pp. 359-386.