

ICTSD Series on Trade Supported Strategies for Sustainable Development



Climate Change Mitigation Policies in Selected OECD Countries

Trade and Development Implications for Developing Countries



By **Diarmuid Torney**

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ICTSD Global Platform on Climate Change, Trade and Sustainable Energy



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ABBREVIATIONS AND ACRONYMS

AUD	Australian dollar
AVE	Ad valorem equivalent tariff
CCS	Carbon Capture and Storage
CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
EITE	Emissions-intensive trade-exposed
EU	European Union
EUR	Euro
GATT	General Agreement on Tariffs and Trade
ICTSD	International Centre for Trade and Sustainable Development
OECD	Organisation for Economic Co-operation and Development
GHG	Greenhouse gas
PPM	Parts per million CO ₂ equivalent
SCM	(WTO Agreement on) Subsidies and Countervailing Measures
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USD	United States dollar
WTO	World Trade Organization

FOREWORD

Article 2 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) sets quantified emissions limitations and reduction commitment for its Annex I Parties, and specifies policies and measures that could be implemented to that effect, in accordance with national circumstances. Such policies and measures include, among others, the enhancement of energy efficiency; the promotion of sustainable forest management practices, afforestation and reforestation; the promotion of sustainable forms of agriculture in light of climate change considerations; development and increased use of renewable energies and other clean technologies; and the progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas (GHG) emitting sectors that run counter to the objective of the Convention and application of market instruments.

While mandating such measures, the Protocol requires of Annex I Parties that they strive to implement such policies and measures “in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties.”

In pursuing the objectives of climate change mitigation, governments around the world have adopted policies and measures, many of which are in line with those contained in the Kyoto Protocol, to reduce their emissions of GHGs. As the core of the Annex I countries, member countries of the Organisation for Economic Co-operation and Development (OECD) play an important role in this context, owing to the fact that they account for most of the emissions reduction expected in the first phase of the Kyoto Protocol, but also because their mitigation actions may have impacts on other countries, including developing countries. Understanding the nature of such potential effects and their consequences for trade and development in developing countries is an important question.

In the past few years, the literature on climate change and trade has documented, in an extensive manner, the inter-linkages between trade and climate change policies. Studies have showed that certain policies to reduce carbon emissions, such as the enactment of energy-efficiency standards, measures aimed at promoting low-carbon production processes in industry and agriculture, or changes in consumer preference for climate-friendly goods and services may have extra-jurisdictional implications. Increasingly, certain policies being considered in OECD countries are expressly extra-jurisdictional in their design, with the objective of triggering abatement effort by other countries that may be considered not to be doing enough on mitigation. The discussion on border measures to achieve climate change objectives is a case in point. While not bound by mandatory carbon reduction obligations under the Kyoto Protocol, developing countries are concerned by the potential impact of these policies.

On the other hand, through measures taken in their jurisdictions and through the channel of international trade, developing countries have opportunities to contribute to abatement efforts in OECD countries, thereby contributing indirectly to global carbon reduction, while playing a role in meeting reduction commitments for Annex I Parties. The Kyoto Protocol has in fact created flexibility mechanisms, including the Clean Development Mechanism (CDM), expressly designed to that effect.

This paper explores a few of the policies and measures enacted, or being considered in OECD countries, and discusses their potential implications for trade and development in developing countries. This paper is produced under ICTSD *Global Platform on Climate Change, Trade and*

Sustainable Energy (Global Platform or GP). The *Global Platform* mobilizes the technical and political expertise to foster strong multilateral regimes on trade and climate change that effectively promote a transition to a low-carbon economy and a sustainable energy future. The *Global Platform* advances the analytical capacity of stakeholders; supports their interaction with policy-makers; and builds effective cross-disciplinary understanding so that solutions can be built and agreed by the international community in the climate change and trade policy processes. It pursues an inclusive path towards the refinement and implementation of negotiating outcomes and their political viability as the world moves towards establishing a post-2012 regime and the basis for a future low-carbon economy.

We hope you will find this paper stimulating and informative reading and useful for your work.



Ricardo Meléndez-Ortiz
Chief Executive, ICTSD

EXECUTIVE SUMMARY

Many governments around the world are adopting progressively more demanding policies and measures in an attempt to reduce greenhouse gas (GHG) emissions. Activity to date has been patchy and slow, and many governments are failing to live up to past commitments. It is unlikely, for example, that many Parties to the 1997 Kyoto Protocol will manage to achieve their GHG emission reduction or limitation targets. Nonetheless, policies to mitigate climate change are becoming increasingly widespread, especially among countries of the Organisation for Economic Co-operation and Development (OECD), and such policies have increasingly obvious ramifications on trade competitiveness and development in developing countries.

However, many developing country trade policy-makers and negotiators remain on the fringe of the climate change debate. This paper seeks to provide trade negotiators and policy-makers with an overview of domestic climate change measures being implemented or considered in OECD countries that may have trade and development implications for developing countries. The paper focuses on a group of selected OECD countries: Australia, Canada, the European Union, Japan and the United States. In the case of several of the countries, legislative proposals are still under consideration. Therefore, this paper aims to give a “snapshot” of the current state of play along with an indication of the policy process towards adoption of climate change mitigation programmes in the countries concerned. Having given a broad overview of the climate change mitigation policies enacted or under consideration in the countries listed above, this paper focuses on five key issues as they relate to the trade and development concerns of developing countries.

- **Border measures:** while the legality and feasibility of such policies may be in question, they are politically attractive to policy-makers in some OECD countries and are likely to be a part of the policy mix. Developing countries should pay attention to the full suite of potential measures, including export rebates and free emission permit allocations, which may act as implicit subsidies for OECD country exports.
- **Renewables:** stringent targets in OECD countries on renewable transport fuels should provide opportunities for efficient developing country producers of feed stocks and biofuel end products, but, at present, most of the market is captured by a small number of countries. Concerns regarding food security need to be fully taken into account in the design of policies in this area.
- **Standards and labels:** these can create barriers to market access for developing country producers. Thus, to avoid the imposition of standards that they will find difficult to meet, developing countries should be involved in the process of setting environmental standards, and should be provided with assistance by OECD countries to build capacity to conform to such standards. Furthermore, some niche markets, such as organic farming, can present new opportunities for developing country producers.
- **Fiscal stimulus packages:** these are likely to restrict market access for some developing country producers due to “buy local” provisions, but the goods in question are likely to be produced by only a few of the most economically advanced developing countries.

- **Kyoto Protocol mechanisms:** the Clean Development Mechanism creates possibilities for investment by OECD countries in emission reduction projects in developing countries, but at present the spread of projects is hugely skewed towards a very small number of large, relatively advanced developing countries.

While the best approach to dealing with the trade and development implications of climate change mitigation policies would be to address them in a comprehensive and coordinated way through a multilateral agreement, the prospect for a global deal on climate change that prioritises the trade and development concerns of developing countries is remote. In the absence of such an ideal agreement, it is important that developing countries' trade negotiators and policy-makers are aware of the likely effects of climate change mitigation policies in developed countries.

1. INTRODUCTION

Many governments around the world are adopting progressively more demanding policies and measures in an attempt to reduce greenhouse gas (GHG) emissions. This is a response to the growing scientific consensus that global emissions of greenhouse gases need to be rapidly and dramatically reduced in order to have a reasonable chance of avoiding dangerous changes in the global climate system. Activity to date has been patchy and slow, and many governments are failing to live up to past commitments. It is unlikely, for example, that many Parties to the 1997 Kyoto Protocol will manage to achieve their GHG emission reduction or limitation targets. Nonetheless, policies to mitigate climate change are becoming increasingly widespread, especially among Organisation for Economic Co-operation and Development (OECD) countries.

In OECD countries, these policies have increasingly obvious ramifications on trade competitiveness and development in developing countries. However, many developing country trade policy-makers and negotiators remain at the fringe of the climate change debate. This paper seeks to provide trade negotiators and policy-makers with an overview of domestic climate change measures being implemented or considered in OECD countries that may have trade and development implications for developing countries. The paper focuses on a group of select OECD countries: Australia, Canada, the European Union (EU), Japan and the United States (US). In the case of several of the countries, legislative proposals are still under consideration. Therefore, this paper aims to give a “snapshot” of the current state of play along with an indication of the policy processes towards the adoption of climate change mitigation programmes in the countries concerned.

There is a substantial and growing academic and policy debate on the institutional, legal, and policy linkages between international trade and efforts to combat climate change. While this paper draws on the insights of these debates, it does not attempt to develop new knowledge within these debates. Rather, the discussions that have taken place within the academic and policy-making communities are used here to shed light on the most salient aspects of climate change mitigation policies in OECD countries, as they affect the trade and development prospects of developing countries. Moreover, this paper does not address all aspects of the intersection between trade and climate change, which are covered more extensively elsewhere (ICTSD 2008b; WTO and UNEP 2009). Instead, this paper focuses only on the trade and development implications of climate change mitigation policies in OECD countries.

Section 2 outlines some of the key features of the international climate change regime, including its historical development, and the trajectory and process of the on-going international negotiations. It also discusses some of the principles of the international climate change regime that are relevant to relations between developed and developing countries. Section 3 considers current and proposed climate change mitigation policies in Australia, Canada, the EU, Japan, and the US. Building on these accounts, Section 4 outlines some of the most salient issues that may arise for developing countries as a result of climate change mitigation policies and measures introduced by OECD countries.

2. OVERVIEW OF THE INTERNATIONAL CLIMATE CHANGE REGIME

At the core of the international climate change regime are the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol to the UNFCCC. The Convention was agreed on 9 May 1992 and entered into force on 21 March 1994. It enjoys near universal membership, having been ratified by 192 states. The overall objective of the Convention is “to achieve ... stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.” This goal is to be achieved, according to the Convention, “within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner” (Article 2). To achieve this goal, the ambition set out in the Convention was to achieve a return to 1990 levels of global GHG emissions by 2000 (Article 4.2 (b)), a goal that was not met.

A key principle of the Convention, which has framed international negotiations on climate change ever since, is the principle of “common but differentiated responsibilities and respective capabilities” of the Parties to the Convention. This is based on the recognition that, “The largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs” (Convention Preamble). The Preamble also recognises the “legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty.” In accordance with this principle, Article 3.1 states that, “developed country Parties should take the lead in combating climate change and the adverse effects thereof”, and that, “The specific needs and special circumstances of developing country Parties... should be given full consideration” (Article 3.2).

The principle also finds expression in the division by the Convention of members into Annex I and non-Annex I parties. Annex I countries include all OECD (in 1992) as well as “countries that are undergoing the process of transition to a market economy”, and are expected to assume greater responsibility for reducing their GHG emissions and providing assistance to developing country members.

The Convention also explicitly considers the implications of action on climate change for patterns of international trade and trade policy. Article 3.5 of the Convention states that, “Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.” The Convention does not rule out the use of unilateral trade measures, but does specify that, if used, they should be implemented in accordance with the norms of the international trade regime (O’Brien 2009).

Recognising that the Convention in itself would be insufficient to motivate effective action to combat climate change, the Parties to the Convention agreed at Kyoto in December 1997 to quantified emission reduction or limitation targets for Annex I Parties to the Convention. The Kyoto Protocol entered into force on 16 February 2005, having been ratified by the required number of states,¹ and to date has been ratified by 184 Parties. The most notable non-ratifying state is the US. The Kyoto Protocol was signed by the Clinton Administration, but was never submitted to Congress for ratification. In 2001, incoming President George W. Bush withdrew the US from the Kyoto Protocol in one of the first acts of his Presidency.

The overall target of the Protocol is a 5.2 percent reduction below 1990 levels of GHG emissions during the “first commitment period” from 2008 to 2012. The Protocol builds on the principles of the Convention, including most notably the principle of common but differentiated

responsibilities, and assigns to Annex I Parties of the Convention quantified emission limitation or reduction commitments, which are set out in Annex B of the Protocol. Parties to the Protocol have agreed to “strive to implement policies and measures ... in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties” (Article 2.3).

Current negotiations on an international agreement for the period beyond 2012 (the end of the first commitment period of the Kyoto Protocol) are taking place in two parallel forums. Firstly, Parties to the Kyoto Protocol are negotiating further commitments under the Protocol beyond 2012. These negotiations are taking place in the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol, which was established in December 2005 in Montreal, Canada. These negotiations are due to conclude in Copenhagen, Denmark, in December 2009. Secondly, all Parties to the Convention (i.e. including the US) are negotiating under the “Bali Road Map”, launched in December 2007, which also aims to complete negotiations in Copenhagen in December 2009. These negotiations are focusing on the topics identified in the

“Bali Action Plan”, namely: (i) a shared vision for long-term cooperative action; (ii) mitigation; (iii) adaptation; (iv) technology development and transfer; and (v) financing.

Climate change negotiators have considered the potential effects of using trade tools to achieve climate change objectives and their related environmental, social and economic consequences, including spillover effects, particularly for developing countries. The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol to the UNFCCC has recognised such concerns and agreed that any future work on the assessment of and possible action to address such consequences, in particular in developing countries, should focus on the causes and effects (see for example: UNFCCC 2008, UNFCCC 2009a). At the August 2009 negotiating session in Bonn, Germany, the Indian delegation proposed including in a new agreement the following text: “Developed country Parties shall not resort to any form of unilateral measures including countervailing border measures, against goods and services imported from developing countries on grounds of protection and stabilization of the climate.” While this proposal attracted the support of many developing countries, the EU, Japan and the US opposed it.²

3. CLIMATE CHANGE MITIGATION POLICIES IN OECD COUNTRIES

The bulk of greenhouse gas emissions in industrialized countries originate from their energy, industrial and transport sectors.³ In OECD countries, a total of 84.4 percent of GHG emissions are generated from energy consumption, of which 34.5 percent are from electricity and heating, 12.6 percent are from manufacturing and construction, and 21.3 percent are from transport (World Resources Institute 2009). To address these emissions, OECD countries are implementing or considering a wide range of policy measures. While some of these policies,

such as border measures on carbon-intensive imports, are designed to achieve specific goals with respect to developing countries, many more mitigation strategies implemented by OECD countries may have less intended consequences for developing countries. Section 4 below considers some of the most relevant aspects of OECD-country mitigation strategies for developing countries. Before doing so, this section outlines the key elements of the domestic mitigation policies in Australia, Canada, the EU, Japan and the US.

3.1. Australia

Percentage of global emissions (2005):	1.45 %
Emissions per capita (2005):	26.9 tons
Kyoto Protocol target:	108 %
Change in emissions 1990-2007:	+ 30.0 %
Domestic emission targets:	5-25 % below 2000 levels by 2020 60 % below 2000 levels by 2050
Primary policy instrument:	Emissions trading scheme
Status of implementing legislation:	Passed by House of Representatives in May 2009; defeated by Senate August 2009; further Senate vote expected in November 2009

Source: UNFCCC (2009b); World Resources Institute (2009).

Australia is the world's largest exporter of coal, the most polluting fuel for power generation. Coal accounts for 80 percent of domestic electricity generation, which in part accounts for Australia's very high level of per capita GHG emissions. At 26.9 tons, this figure is the fifth highest of any country in the world, ahead of the United States. Australia initially refused to ratify the Kyoto Protocol, but when the Conservative government of John Howard was replaced by the Labour government of Kevin Rudd in 2007, Australia reversed its stance and ratified the Protocol at the United Nations Conference of the Parties in Bali, Indonesia, in December 2007.

The Australian government has set a long-term target of a 60 percent reduction in greenhouse gas emissions from 2000 levels by 2050, and a medium-term national target to reduce greenhouse gas emissions by between 5 percent and 25 percent below 2000 levels by 2020. This 2020 target was announced in May 2009 and represents an increase in ambition over previous targets, but is subject to a number of conditions: (i) it would only be agreed to as part of a comprehensive global deal capable of achieving 450 parts per million CO₂ equivalent (ppm), covering all relevant gases, sources and sectors, including forests and land; (ii) there must be a clear trajectory for total global emissions consistent with 450 ppm, with a defined peak year for global emissions no later than 2020; (iii) advanced economies must commit to aggregate reductions of at least 25 percent relative to 1990 by 2020; (iv) major developing countries must agree to slow growth of emissions and then reduce absolute emissions over time.

On 15 December 2008, the Australian government released a White Paper entitled "Carbon Pollution Reduction Scheme: Australia's Low Pollution Future". The paper outlines the final design of the "Carbon Pollution Reduction Scheme" and decisions on other significant climate change programmes. Implementing legislation was passed by the House of Representatives on 4 June 2009, but was defeated in a vote in the Senate on 12 August 2009 by 42 votes to 30. The legislation is due to be re-introduced in the Senate in November 2009 and it is anticipated that the legislation will not be blocked by the opposition at the second attempt because an early election would damage the opposition. The proposed scheme would cover around 75 percent of Australia's emissions and involve mandatory obligations for around 1,000 entities. The scheme would impose a price cap of 40 Australian dollars (AUD) per ton, rising at 5 percent a year, and it has been suggested that, in the future, Australia and New Zealand may create a unified Emissions Trading Scheme.

The proposed scheme contains measures to prevent leakage, under the title "Emissions-intensive trade-exposed" (EITE) industries assistance programme. Emissions intensity for the purpose of the scheme is to be defined in terms of emissions per AUD million of revenue or per AUD million of value added. The criteria of trade exposure is defined by having a trade share (the ratio of the value of imports and exports to the value of domestic production) of greater than 10 percent in any year between 2004 and 2005, and 2007 and 2008, or a demonstrated

lack of capacity to pass through costs due to the potential for international competition. Highly emission-intensive industries are to receive 90 percent free provision of permits, while moderately emissions-intensive industries are to receive 60 percent free provision of permits, based on the level of current production. The rates of assistance per unit of production will decrease by 1.3 percent per year, and will be reviewed every five years or at the request of the responsible minister, for example, on conclusion of an international agreement. Significantly, the Australian plan specifies that assistance should not breach Australia's international trade obligations as they relate to Australia's obligations as a member of the World Trade Organisation and a party to the Agreement on Subsidies and Countervailing Measures, and a number of bilateral free trade agreements (Australian Government 2008).

In addition to the Carbon Pollution Reduction Scheme, other major elements of Australia's mitigation strategy are the expanded Renewable Energy Target investment in renewables and carbon capture and storage and action on energy efficiency. Under the "Renewable Energy Target", 20 percent of electricity is to be generated from renewables by 2020. The implementing legislation was passed on 20 August 2009. A "Clean Energy Initiative", announced on 12 May 2009, commits AUD 4.5 billion to clean energy, including AUD 3.5 billion of new funding. This includes funding for a "Carbon Capture and Storage Flagships" programme, for solar energy, and to establish a "Renewables Australia" programme to support leading edge technology research and bring it to market. In 2007, Australia became the first country to enact an outright ban on incandescent lights, which will take effect in 2010.

3.2. Canada

Percentage of global emissions (2005):	1.94 %
Emissions per capita (2005):	22.6 tons
Kyoto Protocol target:	94 %
Change in emissions 1990-2007:	+ 26.2 %
Domestic emission targets:	20 % below 2006 levels by 2020 60-70 % below 2006 levels by 2050
Primary policy instrument:	Emissions trading scheme, but based on intensity targets rather than absolute caps
Status of implementing legislation:	Regulatory framework has been published but status of implementation is unclear

Source: UNFCCC (2009c); World Resources Institute (2009).

Although Canada has a small share of total global emissions at 1.94 percent, its per capita emissions level is 22.6 tons, slightly lower than that of the United States, and the eighth highest of any country in the world. The Canadian government has indicated that Canada will not meet its Kyoto commitment within the compliance period, but will act "even more aggressively at home" while pursuing an international consensus (Drexhage, Murphy and Gleeson 2008). Much of Canada's emissions come from energy and natural resource extraction sectors that are highly energy intensive. Policy-making is complicated by the fact that, under the federal system, provincial governments have jurisdiction over development and

management of natural resources. The current federal government is a minority Conservative government led by Prime Minister Stephen Harper. In 2007, the government set an overall target of reducing absolute GHG emissions by 20 percent below 2006 levels by 2020, and from 60 to 70 percent below 2006 levels by 2050. It also set a goal of generating 90 percent of electricity from non-emitting sources (including hydro, nuclear, clean coal, wind) by 2020.

In international climate change negotiations, Canada has called for engagement of all major emitting countries and commitments by major developing countries to limit and then stabilize

emissions growth. With respect to competitiveness concerns, Canada has pursued an approach of engaging all major GHG emitters in global mitigation efforts, emphasizing the point that sectoral approaches to mitigation can result in mitigation in major emitting developing countries and lessen competitiveness concerns in industrialized countries. The use of unilateral trade measures to address competitiveness concerns has so far not formally been contemplated by the Canadian government, but climate mitigation targets have arguably not been stringent enough to generate sustained concerns about competitiveness.

Canada's existing legislative framework for national climate change policy centres on a programme called "Turning the Corner", comprising the "Regulatory Framework for Air Emissions" of April 2007, which was further elaborated in March 2008 in the "Regulatory Framework for Industrial Greenhouse Gas Emissions". This represents the first mandatory and enforceable action on climate change that has been introduced at the federal level. Under this Regulatory Framework, all covered industrial sectors would be required to reduce emissions intensity per unit of output from 2006 levels by 18 percent by 2010, and by two percent per year thereafter. Although the targets for firms are based on emissions intensity rather than absolute caps, the scheme would operate along the lines of an Emission Trading Scheme in the sense that firms could trade credits, could use Certified Emission Reductions (CERs) from the Kyoto Protocol Clean Development Mechanism (CDM), and could resort

to a domestic offset system, in achieving their targets. The Framework includes a plan to move to fixed targets by between 2020 and 2025.

The Regulatory Framework is expected to achieve approximately 165 million tons CO₂ eq. in direct and indirect reductions from the industrial sector by 2020, which would represent a 37 percent reduction on projected emission levels, or a 21 percent reduction on 2006 levels. The Regulatory Framework also includes measures targeted at emissions from the transportation sector including mandatory car and light truck fuel efficiency standards to be applied in 2011, and energy efficiency standards applicable to consumer and commercial products. It is due to come into force on 1 January 2010. However, there is uncertainty regarding whether it will in fact be implemented, with Environment Canada stating that the government will "introduce a full suite of domestic policies addressing all major sources of emissions prior to the UN meetings in Copenhagen this December" (Environment Canada 2009).

Under its economic stimulus plan, entitled the "Economic Action Plan", the Canadian government has allocated more than 2 billion Canadian dollars (CAD) to green investments; CAD 1 billion over five years for clean energy research and demonstration projects, including CAD 650 million for large-scale Carbon Capture and Storage (CCS) projects; and CAD 1 billion for a Green Infrastructure Fund, focusing on electricity transmission and sustainable energy.

3.3 European Union

Percentage of global emissions (2005):	13.37 % (EU 27)
Emissions per capita (2005):	10.3 tons (EU 27)
Kyoto Protocol target:	92 % (EU 15) ⁴
Change in emissions 1990-2007:	- 4.3 % (EU 15) - 9.3 % (EU 27)
Domestic emission targets:	20-30 % below 1990 levels by 2020
Primary policy instrument:	Emissions trading scheme
Status of implementing legislation:	Agreed by EU leaders December 2008

Source: European Environment Agency (2009); UNFCCC (2009d); World Resources Institute (2009).

The European Union, which expanded to 27 member states at the beginning of 2007, constitutes the largest integrated market in the world. The period 1990-2007 saw a decline in emissions of 4.3 percent from the 15 member states, which comprised the EU at the time the Protocol was agreed. Emissions from the current 27 member states fell by 9.3 percent over the same period, owing to the fact that many of the heavily polluting industries in the former centrally-planned economies of Eastern Europe closed in the years following 1989-1990.

At a meeting of the European Council in March 2007, European leaders agreed a headline goal to unilaterally reduce GHG emissions by 20 percent relative to 1990 levels by 2020, or by 30 percent in the context of an ambitious global agreement on climate change. This higher target is conditional on "economically more advanced developing countries ... contributing adequately according to their responsibilities and respective capabilities." EU leaders also agreed to commit to reduce energy consumption by 20 percent by 2020 relative to projected trends, and to increase the share of renewables in total energy consumption by 20 percent. Furthermore, they agreed to increase to 10 percent the share of petrol and diesel consumption from sustainably produced biofuels.

Following agreement on these headline goals, a detailed set of proposals, entitled the "Climate and Energy Package", were put forward by the European Commission in January 2008 and were agreed, with revisions, by member state leaders and by the European Parliament in December 2008. The centrepiece of this package is a revised version of the EU Emission Trading

Scheme (EU ETS). The revised scheme will be extended to cover more greenhouse gases and cover all major industrial emitters. It is designed to reduce emissions in covered sectors by 21 percent by 2020 relative to 2005. In contrast to phases I and II of the EU ETS,⁵ allocation of permits will be conducted centrally by the European Commission in accordance with agreed rules, rather than by the governments of member states under "National Allocation Plans". The power generation sector will face full auctioning of emission permits by 2013, but certain member states will be entitled to a temporary derogation from this rule. Other sectors, including aviation, are to increase to full auctioning by 2027 on a phased basis. Under the revised scheme, EU firms will still have access to CDM credits as an alternative to reducing their own emissions, but the total amount of credits used by firms across the EU in total may not exceed 50 percent of total reduction between 2008 and 2020. In sectors not covered by the revised Emission Trading Scheme, EU leaders agreed to reduce GHG emissions by a total of 10 percent below 2005 levels. Under an "effort-sharing agreement", each member state has been given an individual target, ranging from 16 percent below 2005 levels for the Netherlands, to 14 percent above 2005 levels for Poland. These targets are binding on member states and are enforceable through internal EU legal mechanisms.⁶

The revised EU ETS contains a number of provisions to deal with concerns regarding competitiveness and leakage. In September 2009, the European Commission published a list of 164 industrial sectors and sub-sectors which it deems to be "exposed to carbon leakage" (European Commission 2009a). This list is to

be scrutinised by the EU Council of Ministers and the European Parliament with a view to adoption before the end of 2009. The covered sectors account for approximately one quarter of all emissions covered by the EU ETS, and approximately 77 percent of industrial emissions covered by the EU ETS. By the end of 2010, the European Commission is to determine “common performance benchmarks” for each covered sector, which will be based on the average performance of the 10 percent most efficient (in terms of GHG emissions) firms in the sector during the period 2007-2008. Each firm in an exposed sector will be granted 100 percent free emissions allowances based on these common performance benchmarks and production from 2005 to 2007, with adjustments in allocation if firms change their capacity. The free allocation will decline over time in line with the overall emission cap under the ETS. This provision is to be reviewed in the event of a successful international agreement. Furthermore, member states may compensate certain installations within their jurisdictions for CO₂ costs passed on in electricity costs if these costs would expose them to carbon leakage. European Union state aid rules are to be modified to allow for this.

Border measures are not included in the package of measures agreed in December 2008, despite receiving prior support from the French President, who announced in 2007 the prospect of climate tariffs against products from the People’s Republic of China in the event that China would not commit to binding emission reductions in international negotiations (Dröge 2009). This may be due to the fact that the EU has historically been somewhat, though not entirely, less inclined than the US to resort to unilateral trade measures in general (van Asselt, Brewer and Mehling 2009). It may also be due to the fact that evidence regarding the EU ETS since 2005 indicates that it has not triggered changes in trade flows or production patterns for cement products, iron and steel, refineries, or aluminium (Ellermann, Oliver, Xingyu and Qiang forthcoming; Reinaud 2008; Reinaud 2009, p. 9). This is most probably due to the fact that there was a general over-allocation of permits in the first phase of the ETS, and producers with competitiveness concerns were provided with

rebates (Reinaud 2009, p. 9). Furthermore, since a comparatively large proportion of EU member states’ external trade is with other OECD countries rather than with developing countries, industries in the EU are perhaps less exposed to competition from firms in non-Annex I countries than firms in other OECD countries (Weber and Peters 2009).

The December 2008 agreement also elaborated on the March 2007 headline goal for renewable energy. Under the final agreement, each member state has been allocated a national target for the percentage of final energy consumption to come from renewable sources by 2020, ranging from 49 percent for Sweden to 10 percent for Malta. The previously agreed target for biofuels - that 10 percent of transport fuel is to come from sustainably produced biofuels by 2020, is the same across all member states. Throughout Europe, biodiesel is a much more important biofuel than is bioethanol. European Union tariff duties are relatively low for biodiesel (6.5 percent), whereas tariffs on ethanol are to an ad valorem equivalent (AVE)⁷ of 40-100 percent depending on the price of ethanol - the lower the price of ethanol, the higher the ad valorem equivalent (Jönsson 2007). Brazil is the largest exporter of ethanol to the EU, constituting 20-25 percent of EU imports. Various investment grants are available to European farmers to further encourage the uptake of these new technologies. The EU’s rural development regulation, part of the Common Agricultural Policy (CAP), provides for various forms of on-farm and rural investment. European Union subsidies to domestic biofuel producers - tax exemptions and the “Energy Crop Payment” under the CAP reform of 2003 - have ensured that oilseeds producers have received support under the Single Farm Payment and benefit from market price support. The EU’s plans for environmental sustainability criteria for biofuels could be challenged in the World Trade Organization (WTO), and they will be defended successfully only if the EU can show that they are non-discriminatory and scientifically based, and that they have been imposed only after meaningful negotiations with the EU’s main suppliers to develop international standards (Swinbank 2009).

Energy efficiency is also an important aspect of EU policy on climate change and energy. On 18 March 2009, the European Commission adopted two ecodesign regulations to improve the energy efficiency of household lamps and office, street and industrial lighting products. Inefficient lamps - incandescent bulbs and conventional halogen bulbs - will be phased out gradually from the European Union market between September 2009 and September 2012 and will be replaced

by more efficient lighting (European Commission 2009b). Legislation published in April 2009 concerning emissions from vehicles sets a “fleet average” limit of 130 g CO₂ per km. This target is to be phased in across the sector over the period 2012-2015. The legislation sets a longer-term target of 95 g CO₂ per km for 2020. The package also contains provisions to support carbon capture and storage technologies, and new rules for state aid towards climate projects.

3.4. Japan

Percentage of global emissions (2005):	3.56 %
Emissions per capita (2005):	10.5 tons
Kyoto Protocol target:	94 %
Change in emissions 1990-2007:	+ 8.2 %
Domestic emission targets:	25 % below 1990 levels by 2020
Primary policy instrument:	Mainly voluntary measures
Status of implementing legislation:	Status of policy development and implementation unclear due to August 2009 election

Source: UNFCCC (2009e); World Resources Institute (2009).

Japan accounts for 3.56 percent of global GHG emissions, with per capita emissions of 10.5 tons, less than half that of the US. At the present time, Japanese climate change policy, like most areas of Japanese policy, is in a state of flux due to the recent landslide victory of the Democratic Party of Japan (DPJ) in general elections on 30 August 2009. Under Yukio Hatoyama, the Democratic Party won 308 out of 480 seats in the House of Representatives, displacing the Liberal Democratic Party (LDP), which had held power for all but 11 months since 1959. The previous Liberal Democratic Party government under Prime Minister Aso had set a GHG emission reduction target of 15 percent below 2005 levels by 2020, equivalent to eight percent below 1990 levels, although this was to be constituted solely of domestic action and did not include purchasing emission credits from other countries. The LDP government had also proposed an emission reduction of 60-80 percent by 2050, and had argued that emissions needed to peak in developed countries by 2015 and in developing countries by 2025.

The new DPJ government under Hatoyama has announced an increase in the headline emission reduction target to 25 percent below

1990 levels by 2020. In a speech to the United Nations leaders' summit on climate change on 22 September 2009, Hatoyama also urged developing countries to take “common but differentiated responsibilities” for reducing greenhouse gases, arguing that this is “especially important for developing countries with large emissions”. Hatoyama indicated that his government aims to achieve the announced target by “mobilizing all available policy tools”, though it remains to be seen what this means in concrete terms (AFP News 2009).

To date, the general orientation of Japanese climate change policy has been towards voluntary measures rather than binding targets. Following the agreement of the Kyoto Protocol in 1997, the government introduced in 1998 a “Guideline of Measures to Prevent Global Warming” and “Law Concerning the Promotion of Measures to Cope with Global Warming”, which created a legal framework for climate change policy. After the entry into force of the Kyoto Protocol in 2005, a “Kyoto Protocol Target Achievement Plan” was introduced which comprised a list of planned measures at national level. This Plan included some obligations, such as for large companies to report emissions, but was very

limited. Although debate on the development of a Japanese emissions trading scheme has been on-going for many years, such proposals have been strongly resisted by industry and others. A core part of Japanese mitigation policy is the Keidenren Voluntary Action Plan. It is voluntary in two respects: firstly, participation by firms in the scheme is voluntary; secondly the targets against which participating firms are measured are set by the firms themselves. Since Japanese policy to date has focused overwhelmingly on voluntary measures, climate change mitigation policy has not generated the same intensity of competitiveness concerns, or the same calls for border adjustments, that have been witnessed in other OECD countries, particularly the US. Opposition has been directed more at the overall targets for Japan under the Kyoto Protocol, which Japanese companies feel are unfair, rather than at the particular design of domestic policy measures (Takamura and Kameyama 2009).

Although, by international standards, the Japanese economy is already relatively energy efficient, improvements in energy efficiency have been an important part of Japanese climate change policy. In May 2006, a “New National Energy Strategy” set goals of a 30 percent energy efficiency improvement by 2030, and a reduction in oil dependence from 50 percent to less than 40 percent by 2030. At the international level, in March 2008, Japan proposed a sectoral approach to global GHG emissions reduction, which would be applied on specific sectors for all major emitters. The Japanese proposal generated strong reactions from developing countries in particular, worried that the setting of international reduction targets of standards would imply mandatory emissions cut for them, in the same manner as would be required of developed countries. The Japanese proposal was eventually reconsidered to mean an additional approach to national mitigation targets of developed countries.

3.5. United States

Percentage of global emissions (2005):	18.44 %
Emissions per capita (2005):	23.5 tons
Kyoto Protocol target:	N/A
Change in emissions 1990-2007:	- 16.8 %
Domestic emission targets:	Return to 1990 levels by 2020
Primary policy instrument:	Possibly emissions trading scheme
Status of implementing legislation:	American Clean Energy and Security Act passed by House of Representatives June 2009; Senate currently debating Clean Energy Jobs and American Power Act

Source: UNFCCC (2009f); World Resources Institute (2009).

The US is a Party to the UNFCCC and, although the Clinton Administration signed the Kyoto Protocol, it was never submitted to Congress for ratification. Per capita emissions are over twice that of the EU or Japan, at 23.5 tons, and the US is responsible for 18.44 percent of global emissions. During the Administration of George W. Bush, there was little by way of climate change policy at the federal level. President Bush was a late convert (in 2005) to the belief that climate change is being caused by human activities, and climate change policy during his Administration focused on voluntary measures. A number of other policy actors, such as states, cities, and private firms, attempted

to fill this policy vacuum by developing strong state-level regulations, regional emissions trading schemes, and other initiatives. In the latter years of the Administration, Congress also sought to move ahead of the Administration on the issue. Since 2003, several climate change bills have been introduced in the US Senate and House of Representatives such as the Boxer-Lieberman-Warner Climate Security Act (S 3036). Since the election of President Obama, federal policy has changed substantially, both rhetorically and, increasingly, substantively. The Obama Administration has made climate change a priority area and has set a target of reducing GHG emissions to 1990 levels by 2020, which

corresponds to approximately a 14 percent decrease on 2005 emission levels. US climate change programmes focus on a range of issues and measures, including energy efficiency, renewable energy, methane and other non-carbon dioxide (non-CO₂) gases, agricultural practices, and implementation of technologies to achieve greenhouse gas reductions.

In June 2009, the House of Representatives passed the American Clean Energy and Security Act ("ACES", HR 2454), sponsored by Representatives Waxman and Markey, by a narrow margin of 219 to 212 votes. The ACES Act sets out a goal of achieving a 20 percent reduction in GHG emissions relative to 2005 by 2020, and a cap-and-trade scheme with a 17 percent reduction target. These correspond to 7 and 4 percent reductions relative to 1990 emissions, respectively. The ACES Act also sets out a longer term goal of achieving an 83 percent reduction in emissions by 2050, which corresponds to an 80 percent reduction relative to 1990 levels. The cap-and-trade scheme envisaged in the ACES Act would be extended in coverage over time, from 66.2 percent of industries in 2012 to 84.5 percent in 2016. The scheme would allow total offsets of up to 2 billion tons annually, divided equally between domestic and international offsets. International offsets could only come from developing countries that are a party to a bilateral or multilateral climate change treaty with the US. The ACES legislation also sets targets for clean energy, including a 20 percent renewables (hydro not included) target by 2020, though up to 25 percent of this obligation can be met through efficiency, and states may petition to increase this to 40 percent. The legislation also proposes setting new government standards for energy efficiency across a range of areas, including buildings, lighting and appliances, transportation, and industry.

To deal with competitiveness and leakage concerns, the ACES Act proposes to give rebates to sectors with either five percent energy or GHG intensity and 15 percent trade intensity; or 20 percent GHG intensity (Pew Center on Global Climate Change 2009b).⁸ Each sector covered by this programme would be rebated at 100 percent direct and indirect emissions

costs. Such rebates would be phased out from 2025 unless the President determines that other countries have not taken sufficient domestic action. On top of this proposed rebate scheme, the ACES Act also provides for the creation of an "international reserve allowance program". If US international negotiating objectives on climate change were not met by January 2018, the President would establish a programme to adjust energy-intensive imports at the border. This programme would take into account rebates provided. However, the ACES Act also states that international negotiations are the most effective way to deal with competitiveness and leakage concerns, and that international negotiating objectives should include ensuring "equitable emission reductions among all countries".

The Senate is currently considering separate climate change legislation in the form of the Clean Energy Jobs and American Power Act ("CEJAP", S. 1733), sponsored by Senators Kerry and Boxer (Pew Center on Global Climate Change 2009a). The draft bill differs in some respects from the ACES Act. The CEJAP Act focuses primarily on reducing US GHG emissions, whereas the ACES Act is a broader clean energy and climate change bill. In terms of scope, both acts cover the same set of GHG emissions, but the targets differ: while ACES aims for a 17 percent reduction in GHG emissions by 2020 relative to 2005 levels, CEJAP aims at a 20 percent reduction over the same time period. The CEJAP Act provides for free emission allowances to be granted to refineries and to energy-intensive, trade-exposed industries to prevent carbon leakage. The Act also includes placeholder language on border measures on energy-intensive imports. If passed, the Senate legislation will have to be reconciled with ACES Act of the House of Representatives before being forwarded to President Obama for signature. Given the current legislative difficulties surrounding health care reform in the US, it appears unlikely that climate change legislation will be enacted before the Copenhagen conference in December 2009.

The inclusion in the ACES Act and the draft CEJAP Act of measures to deal with competitiveness concerns reflects a more general preoccupation with such concerns in US policy-making. Of 12 market-based climate change bills introduced

in the 110th Congress, almost half called for some border measures, either a tax to be applied to fossil fuel imports or a requirement that energy-intensive imports surrender permits corresponding to the carbon emissions embodied in them. These bills included the Bingaman-Specter “Low Carbon Economy Act” of 2007 and the Lieberman-Warner “Climate Security Act” of 2008 (Frankel 2008). Industry and unions have exerted political pressure to ensure that US targets will not hurt them, but there have been dissenting voices, including within the Obama Administration. On 14 April 2009, US Trade Representative Ron Kirk addressed a letter to Republican representatives Joe Barton, Ralph Hall, Greg Walden and Paul Brown, downplaying the notion that the Obama Administration would implement a border tax on imports from large developing countries to help domestic industry under a cap-and-trade scheme. The letter came in response to questioning from Republican Congressman Joe Barton regarding comments made by Energy Secretary Stephen Chu at a hearing in the House of Representatives in early March. Chu had suggested that in order to prevent leakage and protect local industry under an emissions cap-and-trade programme, the US would not rule out using tariffs and other trade barriers to pressure countries like China and India to cut back on emissions (ICTSD 2009b). Kirk’s letter reads, “The Administration ... does not support any specific measures, including border measures, at this time ... The Administration believes that the best approach to address concerns with carbon leakage is to negotiate a new international climate change agreement in the United Nations that ensures that all the major emitters take long term, significant action to reduce their greenhouse gas emissions.”⁹

In the area of biofuels, US ethanol production in 2007 amounted to approximately 6.5 billion

gallons, and industry analysts believe that 11 billion gallons could be produced in 2009. The Energy Policy Act of 2005 set a consumption mandate of 7.5 billion gallons of renewable fuel by 2012. This was amended by the Energy Independence and Security Act of 2007 which calls for production of 36 billion gallons of biofuels by 2022, nearly a five-fold increase over the 2012 target (Earley 2009). The US federal mandate calls not for production of ethanol to replace gasoline but rather for the two to be blended. Hence, while domestic production is increasing rapidly, there may be scope for imports from developing countries. However, the US applies tariffs on ethanol running from 1.9 percent to 46.5 percent on different tariff lines. Some duty-free imports are allowed under the Caribbean Basin Initiative (CBI), but ethanol would have to be produced from at least 50 percent CBI feedstock. An ad valorem tariff of 4.5 percent is applied on biodiesel. A USD 1/ gallon tax rebate has also been given to blenders of biodiesel. Since the credit does not distinguish between either sources or destinations of the biodiesel to which it applies, it has resulted in access to the credit by domestic blenders for biodiesel produced abroad and domestically produced biodiesel that is exported, which has been called the “splash and dash” loophole.

The US stimulus package, the American Recovery and Reinvestment Act 2009, included over USD 80 billion in clean energy investments. These include USD 11 billion for smart electricity grid development and smart metre deployment, USD 5 billion for low-income home weatherization projects, USD 4.5 billion to improve the efficiency of federal government buildings, USD 6.3 billion for state and local renewable energy and energy efficiency measures, USD 600 million in “green job” training programmes, and USD 2 billion in grants to develop next generation batteries.

4. TRADE AND DEVELOPMENT IMPLICATIONS OF CLIMATE CHANGE MITIGATION

This section reviews and discusses some of the most prominent issues that have emerged in the context of the debate on potential trade and development implications for developing countries of measures taken to address climate change in developed countries. It should be noted that the issues and themes reviewed here constitute a sub-set of a broader body of work on the institutional, legal, and policy linkages between international trade and climate change.¹⁰ This is because the focus of this paper is more specifically on the trade and development implications of climate change mitigation policies in OECD countries. Therefore, this paper does not consider in any detail the broad area of adaptation to climate change, either in developed or developing countries, nor does it cover strategies by OECD countries to aid climate change mitigation in developing countries. The area of adaptation to climate change impacts will become ever more important as the impacts of a changing global climate become increasingly prevalent, and indeed this is an area in which support by developed countries will be required for developing countries. However, the area of adaptation is beyond the scope of this paper, since the focus is on mitigation policies in OECD countries. As a result of this focus, a number of prominent areas in the policy debate are excluded: (i) technology transfer to developing countries and related questions of intellectual property rights; and (ii) financing and investment for climate change mitigation and adaptation in developing countries, which is a prominent aspect in the international climate change negotiations and one of the components of the Bali Action Plan.

Furthermore, this paper does not consider directly the efforts which have been made within the WTO Committee on Trade and Environment to liberalise trade in environmental goods and services (EGS). Discussions on this matter have been on-going under the mandate of the Doha Round of trade negotiations, but have not yielded significant results to date. If an agreement is reached on liberalising trade in

EGS, either within the WTO or elsewhere, the content of that list is likely to have a significant impact on developing countries to the extent that it either includes or excludes them from opportunities to produce the relevant goods and services. Although it is an important aspect of the overall policy debate at the intersection of trade and climate change, it is not in the first instance a tool of domestic mitigation policy in OECD countries, though the issue of supply of climate friendly goods and services from developing countries to developed countries, such as biofuels and sustainable agricultural products, is discussed below (see Section 4.2).

This links to the issue of whether particular categories of developing countries are likely to be impacted more or less by the climate change mitigation policies of OECD countries, since developing countries are clearly a very heterogeneous group. Although the debate on climate change and trade has, to some extent, come to be dominated by the question of carbon import taxes and border carbon adjustments, there are ways in which policies adopted in OECD countries can also offer new trade and development opportunities for developing countries, but these opportunities are not common to all developing countries. It seems that more economically advanced developing countries are liable both to be more adversely affected by the negative impacts of such policies, but also better placed to benefit from the potential opportunities that may arise. For example, China is most commonly the target of discussion of border measures against carbon-intensive imports; yet China is also the location of the largest number of CDM projects, and is best placed to export renewable energy equipment to developed countries as it develops a globally competitive domestic manufacturing capacity in this area. Least developed countries (LDCs), on the other hand, are not likely to be targeted by border measures simply because they rarely export goods to developed countries which would be of concern to the designers of border measures in OECD countries. On the other hand, LDCs are also unlikely to be able to capture markets in

OECD countries for low-carbon goods and services. One exception to this general statement, however, is the area of biofuels, where less economically advanced developing countries may be able to export feed stocks for biofuels to OECD countries. This in itself is controversial, however, since such production may displace food production leading to rising food prices and food insecurity (see Section 4.2 below).

In the longer term, climate change mitigation, at an aggregate level and in high-emitting OECD countries, will constitute an important factor determining the potential for development and poverty eradication. If left unchecked, the negative consequences of climate change are projected to impact vastly disproportionately on developing countries, which are both most vulnerable to changes in the climate system and least able to adapt to such changes.

4.1. Border Carbon Measures, Trade and Competitiveness

Countries set to take on mandatory climate mitigation obligations worry that this may affect the international competitiveness of their energy- and emission-intensive industries. Concerns centre on the economic and social implications of the real or perceived costs of industries losing market shares or relocating to industries in countries without or with less stringent such obligations. These concerns can be divided into two distinct but related categories.

First, there is a concern with what is referred to as “carbon leakage”. Leakage is defined by the Intergovernmental Panel on Climate Change (IPCC) as “the increase in CO₂ emissions outside the countries taking domestic mitigation action divided by the reduction (i.e. positive for reduced emissions) in the emissions of these countries” (cited in Weber and Peters 2009, p. 433). Economic modelling of the leakage impacts of more stringent domestic climate policies than in foreign jurisdictions has produced different results. One study concluded that a EUR 20/tCO₂ carbon price applied in the EU would result in leakage rates of between 0.5 and 25 percent in the iron and steel sector, and between 40 and 70 percent in the cement sector, while another study indicated that a USD 25/tCO₂ tax applied in OECD countries would result in a leakage rate of 45 percent for the iron and steel sector (Reinaud 2008). However, such simulations are highly dependent on the assumptions of the model, making predictions, and comparisons between predictions, difficult. None of the models predict a leakage rate near 100 percent, meaning that carbon leakage is not likely to entirely wipe out an effort to reduce emissions. Empirical studies to date generally show little evidence of leakage

(see Weber and Peters 2009 for details), though there has been some limited evidence of leakage as a result of the EU Emissions Trading Scheme, especially in the cement industry (Weber and Peters 2009, p. 433). In general, however, the absence of evidence of leakage to date may well be because emission reduction targets and their implementation have simply not been stringent enough to generate such leakage. This seems to be especially likely considering the fact that there is theoretical support for carbon leakage (ICTSD 2009a). Furthermore, even with many years of empirical data it may still be difficult to isolate whether or not leakage has taken place (Reinaud 2009, p. 9).

Secondly, climate change mitigation policies generate concerns regarding the competitiveness of domestic industries relative to competing firms in other jurisdictions with less stringent or non-existent emission targets. This aspect generally has received more attention than discussion of carbon leakage in policy debates in OECD countries, particularly in the US. Competitiveness is a concept that is best applied to individual firms or sectors, since the concept has little meaning at the level of a nation-state (Tarasofsky and Cosbey 2007, p. 3). At the firm level, competitiveness depends on many factors, the cost of a carbon constraint being just one. Moreover, the impact of emission reduction measures in relation to firm competitiveness depends on the ability of a firm to pass on cost increases to consumers, which in turn depends on a number of factors, including market concentration, exposure to international competition, and degree of product differentiation (Reinaud 2009, p. 7). In practice, it can

be difficult to separate out the effects of environmental legislation on firm competitiveness from other factors, such as capital and labour costs, lack of regulation, tax differences, proximity to markets, and political stability (Weber and Peters 2009, p. 433).

In response to such concerns, politicians have been considering legislation instituting measures to deal with the potential leakage and competitiveness effects of domestic climate change mitigation policies. Such measures can take a number of forms, including border taxes, rebates to exporters, or free allocation of emission permits to domestic producers within an emission trading scheme. In the case of an emission trading scheme, a number of design factors will impact on the likely intensity of competitiveness and leakage concerns generated. These include (i) the type of target, either an absolute cap or a target level of emissions for each individual source; (ii) the number of participants and range of sectors; (iii) the method used to distribute permits; and (iv) the permissibility of flexibility mechanisms such as banking, borrowing, or credits from other jurisdictions (WTO and UNEP 2009).

Countries such as China and India have been at the centre of most of the debate on border measures. China recently surpassed the US as the world's top emitter of greenhouse gases, prompting calls for more active engagement in global mitigation efforts. As noted above, the American Clean Energy and Security Act, passed by the US House of Representatives in June 2009, and the draft Clean Energy Jobs and American Power Act, currently under consideration by the US Senate, both contain provisions for carbon barriers targeting emerging and developing economies amongst non-Annex I countries currently not obliged to make emissions reductions. The draft counterpart legislation currently under consideration by the US Senate, the Clean Energy Jobs and American Power Act, likewise includes 'placeholder' language that indicates the Senate's intention to also address carbon leakage through some form of border measure. In Europe, border measures were left out of the final "Climate and Energy Package"

agreed in December 2008, although they were very much part of the debate, with the European Parliament calling for border measures against climate "free riders". Studies have started to contemplate the potential implications of the imposition of carbon taxes on developing countries' exports of energy-intensive products in developed country markets.¹¹

Recent studies have pointed to the potential ineffectiveness of unilateral trade measures to encourage action on climate change, which are often referred to as "Border Carbon Adjustments" (BCAs) (Houser *et al* 2008). Another important consideration regarding BCAs is their feasibility (Cosbey 2008). It is generally agreed that a BCA on final consumer goods based on the "embodied carbon" of the good, which are often characterised by very long and complex production chains, would require a level of information about the production process which is not feasible in practice. This would especially be the case for firms in developing countries which may not have the capacity to produce such information. Under such circumstances, BCAs may constitute a barrier to trade for developing countries. An alternative proposal would be to apply BCAs only to basic materials (e.g. aluminium) instead of on manufactured products made from those materials. However, such an approach would probably not cover the sorts of trade that its proponents hope it would cover, since many exports from developing countries to developed countries are finished consumer goods (Weber and Peters 2009, p. 438). A possible alternative measure would be to apply the same tariff rate on all imports of a particular good, calculated on the basis of the domestic CO₂ price and the average emission intensity of domestic producers of the good. This approach could overcome the feasibility difficulties above, and may be compliant with the General Agreement on Tariffs and Trade (GATT)/WTO Most Favoured Nation principle. However, such an approach could not distinguish between more and less efficient foreign producers of the good in question, and could therefore penalise disproportionately more efficient producers. Moreover, the embodied carbon of a good, and thus its contribution to climate change, does not

only depend on how and where it is produced, it can even depend on when it is produced (see Kejun, Cosbey and Murphy).

There are also significant legal issues which arise in the context of carbon related border measures, including potential incompatibility with the GATT and with the Agreement on Subsidies and Countervailing Measures. A common theme in much of the literature is that the precise design of any particular border measure will be crucial in determining whether it is WTO-consistent (see, for example, Cosbey 2008; Weber and Peters 2009 and ICTSD 2009a). Border Tax Adjustments (BTAs) on other types of goods are relatively common and are applied, for example, to imports and exports of alcoholic drinks, which are generally taxed by the importing state (the “destination principle”). However, for a number of reasons, it is not clear whether BTAs would be legal if applied to goods on the basis of their “embodied carbon” since the latter relates more to the process or production method (itself a controversial and much-contested issue in the WTO) used for manufacturing a good, and given further that the carbon consumed is not necessarily incorporated in the imported good. Among the conditions which have been identified for ascertaining the legality of a Border Carbon Adjustment measure are:

- It should not discriminate between domestic producers and foreign producers of like products. For example, if domestic producers are given free allocations of permits in an Emission Trading Scheme, foreign producers must be granted equivalent allocation.
- It should not discriminate between “like products” based on the country of production, a provision that would cause problems for schemes designed to target a few key countries (e.g. China and India).

Some have argued that a BCA might be covered by the exceptions set out in Article XX of the GATT, which allow for measures which otherwise violate GATT rules, provided they are “necessary to protect human, animal or plant life or health”, or “relating to the conservation of exhaustible natural resources”. In order to qualify for

coverage by these general exceptions, a BCA would have to fulfil the conditions that:

- It is 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;
- It must be designed to take into account all policies and measures implemented by trading partners that might have an impact on climate change;
- It must take into account differences prevailing among individual producers. Therefore, it is not enough to target all producers in a particular country and treat them the same way;
- It can only be implemented after a good faith, concerted attempt to gain multilateral agreement to address the problem.

The established UNFCCC principle of “common but differentiated responsibility” suggests that responsibility for climate change should be distributed equitably, but unilateral measures arguably would not achieve this. The use of unilateral measures also raises the issue of whether one state can legitimately extend its environmental (or other) policies unilaterally to another jurisdiction. O’Brien argues (2009, p. 1107) that international environmental agreements are consistently respectful of territorial sovereignty. The UNFCCC Preamble acknowledges states’ “sovereign right to exploit their own resources pursuant to their own environmental and developmental policies”, with the proviso that they “ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”

Another way in which BCAs can potentially interact with trade rules is if they are considered to be an export subsidy. Much of the existing debate on BCAs concerns the application of tariffs on imports, a measure which would be covered by the GATT. However, another way of dealing

with competitiveness concerns is to provide aid of some sort to firms exporting products to markets in which producers are subject to less stringent emission commitments. This could take the form of direct rebates to domestic producers or, alternatively, the free allocation of emission permits as part of an Emissions Trading Scheme. BCAs on exports might be covered by the WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement), which sets out conditions for the granting of subsidies. Debate on

whether BCAs can be defined as a subsidy under the SCM Agreement, and thus if they are covered by this Agreement, focuses on its footnote 1, which exempts certain BTAs on exports from the definition of a subsidy (ICTSD 2009a). Assuming that footnote 1 does not provide an exemption for BCAs on exports, these will be consistent with the SCM Agreement if they are not related to export performance or input requirements, and provided certain conditions are met (Lodefalk and Storey 2005, p. 37).

4.2. Renewable Energy

Policy targets for renewable energy exist in at least 66 countries worldwide, including all 27 EU countries, 29 US states (and Washington DC), and nine Canadian provinces. Most targets are for shares of electricity production, primary energy, and/or final energy by a future year. The development of the renewable energy sector is backed by supporting policies in most OECD countries. The most common policy is the feed-in law. By 2007, at least 37 countries and nine states/provinces had adopted feed-in policies. Another common policy measure is a "Renewable Portfolio Standard", whereby electricity generation companies are mandated to produce a specified percentage of their overall electricity from renewable sources. There are many other forms of policy support for renewable power generation, including capital investment subsidies or rebates, tax incentives and credits, sales tax and value-added tax exemptions, energy production payments or tax credits, net metering, public investment or financing, and public competitive bidding. About half of all US states have capital subsidy programmes (or tax credit policies), either state-wide or for specific utilities to promote grid-tied rooftop solar photovoltaic (PV) panels. Both the Sweden and the US provide a 30 percent national tax credit for solar PV (although the US policy was set to expire in 2008). France provides a 50 percent income tax credit. Australia provides rebates up to AUD 8/watt. The United Kingdom restarted a grants programme in 2007 that subsidizes household solar PV, micro-scale wind, and solar hot water. In Japan, over 300 municipalities continue to provide subsidies for solar PV after the expiration of Japan's national subsidy in 2005 (REN 21 2007).

Biofuels are also an important part of the energy renewable package in most OECD countries. Japan's new strategy for long-term ethanol production targets six billion litres per year by 2030, representing five percent of transport energy. These ambitious targets on renewable energy, especially for biofuels, that have been set in OECD countries can hardly be met by local production. They have in most cases been designed with a view to rely partly on imports. Efficient developing country producers such as Brazil, in the case of ethanol, may therefore have an opportunity to supply part of the biofuels needed to meet targets set in the EU, the US and other OECD countries.

Global production of biofuels is dominated by production of ethanol. In 2005, world production of ethanol was 17 million tons of oil equivalent (MTOE) whereas production of biodiesel was three MTOE (Motaal 2008). Brazil and the US produce 80 percent of all ethanol. Indeed, Brazil has a considerable head-start in ethanol production: 90 percent of all new cars were running on hydrous ethanol by the mid-1980s (Motaal 2008). Most ethanol producing countries seem to be relying primarily on domestically produced feedstock. In 2005, the world's largest exporters of ethanol were Brazil, followed by the EU, the US, South Africa, China, Saudi Arabia, Costa Rica and Jamaica. Brazil has the lowest ethanol production costs in the world, breaking even with oil at only USD 35 a barrel (Motaal 2008). Biodiesel has been particularly promoted within the EU. There has been a surge of palm oil imports in the EU, which is attributed to biodiesel production. Between 1999 and 2005,

EU imports of palm oil from Malaysia more than doubled, reaching 4.5 million tons, or 18 percent of world palm oil imports (Motaal 2008).

The potential of developing countries as producers of biofuels, however, is being constrained by certain policies supporting domestic producers in OECD countries through subsidies and taxation, together with tariff barriers that make it more difficult for foreign producers to enter the market. However, there are “substantial opportunities for biofuels exports from developing countries ... which could lead to greater economic growth” (ICTSD 2008a, p. 37). The OECD estimates that, in 2006, the combined support provided by governments in Canada, the EU and the US for biofuel production and use totalled USD 11 billion. This support is projected to increase to USD 25 billion between 2013 and 2017 (OECD 2008). In a sector that is developing fast, with rapidly emerging developing country players, subsidies and support programmes in OECD countries can potentially make it harder for developing country producers to effectively penetrate and compete in the industry. In addition to domestic support programmes, many OECD countries apply tariffs on biofuel imports that prevent the full potential of certain developing country exporters. Furthermore, proposed biofuels criteria, which are supposed to ensure that biofuels meet certain environmental and social objectives, are considered by some to be unfair non-tariff barriers hampering developing country exports. In the EU, biofuels would have to give a real saving in carbon dioxide emissions of 35 percent compared to oil. Feedstock crops cannot be grown on land with high biodiversity values or on land containing high carbon stocks. In addition, growing biofuels feedstock would have to fulfil best agricultural practices criteria. The restrictions would apply both to home-grown and imported biofuels.

The growth of crops for biofuels has been linked to increasing food insecurity in some parts of the world, and has been associated with the spike in food prices in 2008 and the resulting global food crisis. According to Oxfam International, 30 percent of the rise in global food prices during the period from 2006 to 2008 was attributable to

biofuels (Oxfam International 2008). Research by the International Food Policy Research Institute indicates that 30 percent of the increase in the weighted average in cereal prices in the period from 2000 to 2007 is due to increased demand for biofuels (IFPRI 2008). Any policies to encourage the production of feedstocks for biofuels, either in OECD or developing countries, will need to take into account potential impacts on food production.

Apart from these constraints and taking into account the potential impact of biofuel production on food supply and prices, a number of developing countries could make a positive contribution to developed countries’ set targets on renewable energy including biofuels. Brazil, which accounts for 50 percent of US imports of ethanol, could expand its trade. But other countries also stand to benefit. For example, studies on African bioenergy trade potential have shown that the Southern African Development Community (SADC), which produced 939 million litres of bio-ethanol from sugarcane and sweet sorghum in 2005, could in 2020 reach 23 650 million litres of ethanol production (Johnson, Seebaluck, Watson and Woods 2006). Given that the projected SADC petrol demand (energy basis) for 2020 would be 6155 million litres, the region would be left with 17495 million litres of ethanol for export, with an average annual increase of 20 percent. Taking into account sustainability concerns, such a production and export potential could provide an important contribution to the region’s development and poverty reduction efforts.

Other renewable energy sources are potentially an area for growth for larger, more economically advanced developing countries. For example, China is developing a globally competitive wind turbine manufacturing industry and is beginning to export significant numbers of wind turbines to foreign markets. India is developing a significant manufacturing industry in solar power generation. However, these are generally very high technology sectors in which developed countries already have a considerable head-start. Therefore, the opportunities for growth of these industries in most developing countries appear to be somewhat limited in the short term.

4.3. Climate-Related Standards and Labels

The role of carbon standards and labelling schemes is likely to grow in the future, driving improvements in the efficiency of products and production processes, while providing consumers with the option of decreasing their personal carbon footprints. At least 61 countries, representing 80 percent of the world's population, are currently implementing energy performance standards or labels for at least one product. Only a little over 30 developing countries have eco-labelling programmes (Bonsi, Hammett and Smith 2008, p. 418; Waide and Bernasconi-Osterwalder 2008, p. 1). These schemes provide positive product differentiation and market opportunities. However, from a trade policy perspective, standards and labels can in certain cases represent non-tariff barriers to trade. Labels for environmental purposes can vary in terms of a number of key characteristics: (i) mandatory or voluntary; (ii) comparative (relative to other similar products) or endorsement type; (iii) based on design or performance characteristics; and (iv) based on self-reporting or independent assessment (Waide and Bernasconi-Osterwalder 2008, p. 2; WTO and UNEP 2009).

World Trade Organization rules, in particular the Agreement on Technical Barriers to Trade (TBT Agreement), establish a number of conditions that will be relevant in the development and implementation of labelling schemes. However, there is some debate regarding the extent to which the TBT Agreement applies to voluntary independent labelling schemes (Tarasofsky and Cosbey 2007, p. 22; Zhang and Assunção 2004, p. 372). If the TBT Agreement does apply, its Code of Good Practice calls on national governments to try to ensure that independent standard setters comply with TBT rules, but it has not so far been established what sorts of actions this would entail (Tarasofsky and Cosbey 2007, p. 22). To be consistent in principle with WTO rules, standards and labelling schemes would have to be applied in a way that does not discriminate between domestic and foreign producers, that is, in accordance with principle of National Treatment (Zhang and Assunção 2004, p. 367).

A further legal controversy in this area is whether standards and labels can differentiate between otherwise "like products" on the basis of "Process and Production Methods" (PPMs), that is, based on characteristics of the production method of a good which are not incorporated into the final product. There are two types of PPMs: "Product-related PPMs" or "incorporated PPMs", where the characteristics of a product make it polluting upon consumption or use, and "Non-product-related PPMs", or "unincorporated PPMs", where pollution occurs in the production of the good, but its use does not cause pollution (Bonsi, Hammett and Smith 2008, pp. 415-416). It is this second type of PPM which is particularly problematic from the perspective of climate change mitigation, since different "like products" may have been made using production methods that differ considerably in terms of greenhouse gas emissions, but which result in no discernable difference in the final product.

Even if deemed legally compatible with WTO rules, standards and labelling schemes can still act as market access barrier for developing countries because these countries often do not have the technical or financial capacity to adapt their methods of production to those required in the importing countries (Zhang and Assunção 2004, p. 372). For example, of around 200 licensed fresh fruit exporters in Kenya, only four companies dominate the export market because they are the only ones able to adopt high standards in infrastructure and quality control. Survey research by The Energy Research Institute of India shows that a medium-sized Indian firm would need USD 20000-30000 to be able to adopt the ISO 14000 series environmental labelling certification (Bonsi, Hammett and Smith 2008, pp. 419-421). As a result, developing countries are very little involved in trade with eco-labelled goods. In countries where there are no government-endorsed multi-attribute eco-labels, many private schemes may spring up with varying standards, increasing complexity for exporters to that market and therefore acting as a potential barrier to trade for developing countries exporters (Bonsi, Hammett and Smith

2008, p. 418). Moreover, because it is difficult for producers in developing countries to show compliance with the requirements of a carbon label scheme, it is conceivable that such a scheme “could have the perverse effect of failing to recognize and reward products that are carbon-efficient, but simply unable to receive certification” (Meléndez-Ortiz, p. 84).

4.3.1 Energy efficiency standards

Improvements in energy efficiency can provide a significant potential for reducing greenhouse gas emissions in the energy sector (up to 78 percent of the emissions reduction savings potential by 2030), making it a critical climate change mitigation instrument (International Energy Agency 2007). As such, most OECD countries have included in their climate programmes energy efficiency standards in the form of mandatory minimum energy performance standards, with the aim of raising the efficiency level of new products entering the market. In addition, energy-information labels are required by all OECD and EU member states (ICTSD 2008b). Increasingly, governments are taking a further step by phasing out older technologies and products that use more energy and produce more greenhouse gas emissions. Generally, product efficiency standards apply both to domestic and foreign producers, and as such would not pose, *a priori*, problems of legal compatibility. There is less clarity as to standards related to production processes.

For developing countries, practical trade and development challenges relate to cost and the capacity to comply with increasingly diverse and fast evolving standards setting processes. This may affect their ability to enter into, or maintain market share in certain industry segments. According to a survey conducted in 2007 by the General Administration of Quality Supervision, Inspection and Quarantine of China, more than 31.4 percent of China’s exports were more or less affected by the technical trade measures of the importing countries in 2006, resulting in USD 35.92 billion of direct trade loss and USD 19.155 billion of increment in compliance costs. Among the various categories of products most affected by overseas technical trade measures, electrical and electronic equipment ranked first.

The survey also shows that energy efficiency and product-recycling requirements are among the various types of technical trade measures that posed the highest market access barriers for China’s exports in 2006 (ICTSD 2008c).

4.3.2 Carbon standards in agriculture: Food miles

The world trade in fresh fruits, fruit products, vegetables and vegetable products more than doubled over the two decades 1982-1984 and 2002-2004. Developing countries export a third of the total trade. In this context, carbon labelling schemes have emerged as part of an effort to measure and communicate the carbon footprint of agricultural products traded internationally. They are meant primarily to provide consumers with the option of decreasing their personal carbon footprints. The first experiments with carbon labelling took the form of airplane stickers in supermarkets to indicate fresh produce that had been air-freighted from producing countries into markets of consuming countries. These labelling schemes are by nature voluntary and originate in private initiatives by supermarkets and their supply chains in certain OECD countries. For example, in 2007, Tesco and Marks and Spencer labelled all single-ingredient fresh products that were transported by air into the UK with a label showing a plane and saying ‘air freighted’ (see MacGregor 2009). They generally missed the point of full cycle carbon accounting, and ended up hurting some of the poorest and most vulnerable countries that had found a niche market in air-freighting off-season fresh produce such as fruits, vegetable and flowers to OECD markets.

The WTO notes on its website that “some studies conducted on the ‘carbon mileage’ of traded goods have shown that the effect can be the opposite of what is commonly believed. For instance, it has been argued that Kenyan flowers air-freighted to Europe would generate less CO₂ emissions than flowers grown in the Netherlands; or New Zealand lamb transported to the United Kingdom would generate 70 percent less CO₂ than lamb produced in the United Kingdom. Therefore, food miles may be an issue in need of case-by-case analysis, and empirical verification”

(WTO undated). What seems to matter is how goods are produced: transport is only one of a long chain of activities necessary to bring a good to a consumer (Kejun, Cosbey and Murphy 2008). Furthermore, legal experts are of the view that any food miles charges would be a violation of the GATT Article I (the Most Favoured Nation principle), because it would be origin-specific (Hufbauer, Charnovitz and Kim 2009).

Much of the problem with such labelling schemes relates to the fact that they are enacted unilaterally, without the participation of those likely to be affected. Since the role of voluntary carbon labelling schemes is likely to grow in the future, the debate on carbon footprints needs to be expanded to involve all relevant players. In terms of design, a carbon standard should provide a uniform way of calculating the embedded carbon, be universally applicable, account for the majority of the embedded carbon, and be simple and cost-effective (MacGregor 2009). On the other hand, there are certain areas in which developing countries may derive new trade opportunities, making use of product differentiation schemes. Sustainable forms of agriculture, such as organic farming, which contribute to GHG emissions

reductions, are one such area.¹² Some developing countries have emerged as important players in organic farming, and are large exporters of such products. Globally, there has been an increase in demand for organic products with sales increasing by over USD 5 billion per year. Organic Monitor estimates international sales to have reached USD 46.1 billion in 2007. Organic agriculture may offer a real trade and poverty reduction opportunity for developing countries, as 97 percent of the revenues are generated in Europe and North America whereas more than 80 percent of the producers are in Africa, Asia and Latin America. The countries with the most producers are Uganda, followed by India, Ethiopia and Mexico (UNEP 2009). By branding these products effectively on the basis of their climate change benefits, developing countries could expand the trade and development opportunities, while contributing to climate mitigation efforts in the agricultural sector. In addition, in the transition towards a low carbon global economy, new types of services, such as the monitoring and verification of emissions, will be required. This gives developing countries the opportunity to diversify into new tradable services (see Keane 2009).

4.4. Government Fiscal Stimulus Packages

In response to the global financial and economic crisis, many national governments have introduced fiscal stimulus packages in an attempt to generate domestic economic activity. Many of these packages have included significant “green” components, focusing for example on promoting the development and deployment of renewable energy technologies, or research, development, and deployment of clean coal technologies and carbon capture and storage. For example, US President Obama’s fiscal stimulus package, the American Recovery and Reinvestment Act, included more than USD 80 billion in clean energy investment (US Government 2009). Within the EU, attempts by the European Commission to promote a coordinated European fiscal response to the global crisis have been largely unsuccessful. Only EUR 5 billion has so far been agreed (compared to a Commission proposal of EUR 200 billion), though a large proportion of this is being directed towards clean energy investments.

However, if considered as a whole, the percentage of total stimulus spending on low-carbon investments by both the EU and its individual member states is much lower, at less than 10 percent (Nikolova 2009). Elsewhere, South Korea is investing approximately 80 percent of its fiscal stimulus package in climate-related measures (BBC News 2009). Interestingly, the “green” component of China’s stimulus package is the largest of any country, with USD 221.3 billion, or a little under 40 percent of the total stimulus package, allocated to “green” themes, compared with USD 94 billion, or 12 percent of the total stimulus package, in the case of the US (HSBC Global Research 2009).

The government stimulus packages of developed countries may impact on developing countries to the extent that they contain provisions that could restrict market access for environmental goods and services for producers in

developing countries. Since the main point of these packages is to stimulate the domestic economy, they are likely to have such an effect. The “Buy American” provisions of the US stimulus package attracted particular controversy in this regard. Many of the stimulus packages have been framed by governments as trying to achieve “first mover advantage” in new technologies related to low-carbon development. If these efforts are successful, it may also be the case that firms in OECD countries capture market shares for low carbon goods and services in developing countries that might otherwise be exploited by producers in developing countries. On this issue, US President Obama has stated, “We can remain one of the world’s leading importers of foreign oil, or we can make the investments that would allow us to become the world’s leading exporter of renewable energy. We can let climate change continue to go unchecked, or we can help stop it. We can let the jobs of tomorrow be created abroad, or we can create those jobs right here in America and lay the foundation for lasting prosperity” (US Government 2009). Similarly, European Commission President Barroso described the EU’s 2008 “Climate and Energy Package” as “a green ‘new deal’ which will enhance the competitiveness of EU industry in an increasingly carbon-constrained world. Moving to a low carbon economy will encourage innovation, provide new business opportunities and create new green jobs” (European Union 2008). To the extent that these measures succeed in meeting domestic demand for low-carbon goods and services through domestic production, this will hinder trade opportunities for producers of these goods and services in developing countries. However, when considering the impact of such provisions on developing countries, it is worth noting that the issue of market access in this case may apply primarily to large economically more advanced developing countries, since the technologies involved are relatively advanced, and domestic manufacturing capacity is limited in most developing countries.

The plurilateral Agreement on Government Procurement (GPA), which has been signed by some but not all WTO member states, provides

for “special and differential treatment” for developing countries, and calls on Parties to facilitate imports from developing, and particularly least-developed, countries; and to supply, upon request, technical assistance to developing countries seeking to comply with government procurement technical specifications (National Foreign Trade Council 2007). However, most of the Parties to the GPA are OECD members, the exceptions being China, Chinese Taipei, Israel, Lichtenstein and Singapore. Since the rules of the Agreement apply only between contracting Parties to the Agreement, the provisions mentioned above do not have legal effect in relations between OECD countries and most developing countries.

The WTO Agreement on Subsidies and Countervailing Measures (SCM) is also potentially relevant in this area. With respect to greenhouse gas reduction policies in the agricultural sector, subsidies are said to be “the most likely area of conflict with WTO rules” (Blandford and Josling, p. 11). The SCM defines a subsidy as a financial contribution or benefit conferred by a government to its domestic industries (cited in Zhang and Assunção 2004, p. 361). The SCM does not prohibit climate subsidies as such, but they must be designed and applied in a way which ensures that: (i) they are applied objectively to industries within the subsidising country, whether producing for home or foreign markets; (ii) potential effects of the subsidy need to be taken into account; and (iii) transparency is achieved (Lodefalk and Storey 2005, p. 32). Subsidies that are contingent on export performance or input requirements and those that are limited to certain enterprises or industries are prohibited under the SCM. According to Blandford and Josling, “it seems unlikely that specific subsidies connected with climate change would be conditional on exports” (Blandford and Josling, p. 12). Until January 2000, subsidies for research and development as well as subsidies for certain environmental adaptations were provisionally non-actionable, but Parties to the SCM failed to agree on renewing the operation of these provisions.

4.5 Flexibility Mechanisms under the Kyoto Protocol

Developed countries with commitments under the Kyoto Protocol to limit or reduce GHG have access to additional means of meeting their assigned reduction targets, through three market-based mechanisms, created under the Kyoto Protocol (the so-called Kyoto flexibility mechanisms): Emissions Trading, The Clean Development Mechanism (CDM) and Joint Implementation (JI). Emissions Trading under the Protocol allows Annex I Parties to the Convention to purchase emission permits from any other Annex I Party, in order to help them to achieve their emission reduction or limitation target. Joint Implementation allows Annex I Parties to invest in emission reduction projects in other Annex I Parties as an alternative to reducing emissions domestically. The Clean Development Mechanism allows Annex I Parties to invest in emission reduction projects in non-Annex I Parties (i.e. developing countries). These "flexibility mechanisms" were provided for in the Kyoto Protocol but required further elaboration, which was provided by the Marrakech Accords agreed in 2001. For the purposes of this paper, only the CDM is discussed as providing an opportunity for carbon market in the developing countries. Approved CDM projects generate certified emission reduction credits, each equivalent to one ton of CO₂, which can be counted towards meeting Kyoto targets. The CDM is the first global, environmental investment and credit scheme of its kind, providing a standardised emission offset instrument. Many developed countries have initiated CDM projects in developing countries, covering a wide range of sectors such as renewable energy industries, manufacturing industries, chemical industries, agriculture, afforestation and reforestation, transport, among other sectors.

As of 1 September 2009, 4,631 CDM projects were in the Pipeline, of which 1,792 were registered, 2,605 were in the process of validation, and 234 were in the process of registration. Of these, a total of 546 projects have so far been issued with CERs. Of all projects in the Pipeline (i.e. projects at all stages registration), 59 percent are renewable energy projects. Within this

group, 27 percent are hydro projects and 17 percent are wind energy projects. At the other end of the scale, a mere one percent of them are solar energy projects.¹³ The most striking aspect of the CDM project statistics is the geographical distribution: 78.3 percent of all projects in the Pipeline are in the Asia Pacific region, 17.3 percent are in Latin America, with just 2.4 percent in Africa. China is by far the single biggest location for Pipeline projects, with 39.8 percent of all projects. India is the second largest, with 25.5 percent of projects. The combined percentage of all Pipeline projects located in Brazil, China, India and Mexico is 73.3 percent. Statistics on the number of projects only tells part of the story, however, since the more important metric (both in terms of financial transfers to host countries and emissions reductions) is the issuance of CERs. As of 24 September 2009, 45.98 percent of all CERs issued were to projects in China, 21.56 percent were in India, while 13.34 percent were in the Republic of Korea.¹⁴

At present, "mitigation finance available through the CDM is the most sizeable" (Keane 2009, p. 23). CDM projects are expected to enhance sustainable development in host countries, contribute to the transfer of technology, and thereby may enhance export competitiveness in the sectors concerned. A recent survey commissioned by the UNFCCC Secretariat reviewed the project design documents of 3,296 projects in the CDM Pipeline (registered and proposed) as of June 2008, located in 67 host countries. It found that 36 percent of the projects claim transfer of technology. It also indicates that transfer of technology is more common for larger projects (representing an estimated 59 percent in emission reductions). The survey reveals that developed countries - principally France, Germany, Japan, the United Kingdom and the US - are the main origin of transfer of equipment and knowledge (70 percent). Among developing countries, Brazil, China, Chinese Taipei, India, and the Republic of Korea are the most significant sources of equipment and knowledge transfers, but non-Annex I countries in total constitute less than 10 percent of all technology transfer, according to the survey (Seres 2008).

5. CONCLUSION

Concerns about climate change are increasingly prompting national governments to consider and adopt a wide range of policies to reduce emissions of GHGs. While the track record of OECD countries in enacting and implementing climate change mitigation policies and measures has been very mixed, there are many types of policies either already enacted or under consideration which could have considerable implications for the trade and development prospects of developing countries. Drawing on the growing literature on the intersection of trade and climate change policies, this paper has attempted to highlight some of the most important implications for developing countries of climate change mitigation strategies in OECD countries. This has not been an exhaustive review of either the literature on trade and climate change or climate change mitigation policies of the countries under consideration here, but rather has attempted to highlight the most important issues in this area:

- **Border measures:** while the legality and feasibility of such policies may be in question, they are politically attractive to policy-makers in some OECD countries and are likely to be a part of the policy mix. Developing countries should pay attention to the full suite of potential measures, including export rebates and free emission permit allocations, which may act as implicit subsidies for OECD country exports.
- **Renewables:** stringent targets in OECD countries on renewable transport fuels should provide opportunities for efficient developing country producers of feed stocks and biofuel end products, but at present most of the market is captured by a small number of countries. Concerns regarding food security need to be fully taken into account in the design of policies in this area.
- **Standards and labels:** these can create barriers to market access for developing country producers. To avoid the imposition of standards difficult to comply with, developing countries should be involved in the process of setting environmental standards, and should be provided with assistance by OECD countries to build capacity to conform to such standards. Furthermore, some niche markets, such as organic farming, can present new opportunities for developing country producers.
- **Fiscal stimulus packages:** these are likely to restrict market access for some developing country producers due to “buy local” provisions, but the goods in question are likely to be produced by only a few of the most economically advanced developing countries.
- **Kyoto Protocol mechanisms:** the Clean Development Mechanism creates possibilities for investment by OECD countries in emission reduction projects in developing countries, but at present the spread of projects is hugely skewed towards a very small number of large, relatively advanced developing countries.

The best approach to dealing with the trade and development implications of climate change mitigation policies would be to address them in a comprehensive and coordinated way through a multilateral agreement. However, global politics are not conducted in an ideal world, and the prospects for a successful and effective global deal of any kind on climate change in the coming months, let alone one that prioritizes the trade and development concerns of developing countries, are uncertain at present. In the absence of such an ideal agreement, it is important that developing countries trade negotiators and policy-makers are aware of the likely effects of climate change mitigation policies in developed countries.

ENDNOTES

- 1 In order to come into force, the Kyoto Protocol needed to be ratified by at least 55 Parties to the UNFCCC, and by countries representing at least 55 percent of total Annex I GHG emissions (Article 25.1).
- 2 Trade Issues Come to the Fore in Climate Talks, Bridges Weekly Trade News Digest, 9 September 2009, 13(30). Obtained from: <http://ictsd.org/i/news/bridgesweekly/54721/>.
- 3 Comparatively, most emissions in developing countries come from agriculture and forestry, but increasingly from construction and residential sectors as well as from industry.
- 4 When the Kyoto Protocol was agreed in 1997, the EU comprised 15 member states and hence the target for the 'European Community' (the name of the legal entity representing the EU in some international negotiations) refers to these 15 member states only. Of the 12 member states that have joined the EU since 1994, 10 are Annex I countries, while two (Cyprus and Malta) are non-Annex I countries and therefore have no targets under the Kyoto Protocol. Of the remaining 10, eight (Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Romania, Slovakia, and Slovenia) have the same reduction target (92 percent) as the European Community, while two (Hungary and Poland) have a target of 94 percent.
- 5 Respectively, 2005-2007 and 2008-2012.
- 6 The "infringement procedure".
- 7 An ad valorem equivalent tariff (AVE) is a tariff presented as a percentage of the value of goods cleared through customs. It is the equivalent of a corresponding "specific" tariff measure based on unit quantities such as weight, number or volume. The ad valorem equivalents are sensitive to the method of calculation and changes in product prices.
- 8 For the purposes of the ACES Act, GHG intensity is calculated by dividing the number 20 multiplied by total tons of CO₂e (including emissions from direct fuel combustion, process emissions, and indirect emissions from electricity use) of the sector by the value of the shipments of the sector.
- 9 Ron Kirk's 14 April letter to Joe Barton. Obtained from: <http://ictsd.net/downloads/2009/04/kirk-letter-14-04-09.pdf>.
- 10 A reasonably comprehensive overview of this broader area is provided by the recent joint report on trade and climate change by ICTSD (2008a) and by the WTO and UNEP (2009).
- 11 Smelting and pressing of ferrous metals, nonmetal mineral products, chemical material and products, non-ferrous metals, mining of nonmetal minerals, metal products, chemical fibre, and paper and pulp.
- 12 An FAO study (Scialabba and Hattam 2002) concluded that, "CO₂ emissions per hectare of organic agriculture systems are 48 percent to 68 percent lower than in conventional systems."
- 13 All data in this paragraph come from the UNEP/Risoe CDM/JI Pipeline Analysis and Database. Obtained from: <http://www.cdmpipeline.org/>.
- 14 UNFCCC. Obtained from: <http://cdm.unfccc.int/Statistics/Issuance/CERsIssuedByHostPartyPieChart.html>.

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