Chapter 10
CLIMATE CHANGE AND THE INTERNATIONAL TRADE REGIME

SYNOPSIS

I. INTRODUCTION

Since the early 1950s, the volume of trade in manufactured goods has grown at an average annual rate of 7.5 percent. During the same period, international trade in agricultural goods grew annually at 3.5 percent, and trade in fuels and mining products grew at 4 percent. Even over a shorter period of time that includes a global recession — from 2000 to 2010 — the volume of trade in manufactured goods grew by an annual average rate of 4.8 percent, twice as much as fuels and mining products, and trade in agricultural products grew by 3.7 percent. In 2010, total trade in goods grew by 14.5 percent by volume. The dollar value of this trade was $15.2 trillion in 2010. WORLD TRADE ORGANIZATION, INTERNATIONAL TRADE STATISTICS 2011 1–2, 23–24, 50 (2011).

International trade exerts a tremendous influence over climate change. With increased trade, carbon dioxide (CO_2) emissions also grow, principally from transportation, as goods move around the world by trains, planes, trucks, and ships. In addition, many developed countries are essentially "outsourcing" their greenhouse gas emissions to developing countries by importing goods and services produced in developing countries. By some estimates, more than one-third of CO_2 emissions related to the consumption of goods and services in developed countries are actually emitted outside their own borders, with 23 percent of all global emissions embodied in traded goods. Steven J. Davis and Ken Caldeira, *Consumption-based Accounting of CO_2 Emissions*, PNAS 5687–92 (Mar. 23, 2010). Glen P. Peters et al., *Growth in Emission Transfers via International Trade from 1990 to 2008*, PNAS 8903–08(May 24, 2011); Steven J. Davis et al., *The Supply Chain of CO_2 Emissions*, PNAS 18554–59 (Nov. 8, 2011).

Trade is also at the heart of some countries' reluctance to embrace the Kyoto Protocol or deeper cuts within the Cancun Agreements. The United States, for example, has long worried that producers of manufactured goods that are not required to reduce CO_2 emissions would be able to outcompete U.S. producers that would be required to reduce CO_2 emissions. Because developing countries do not have emission limitation obligations under the Kyoto Protocol, and developed country "commitments" are contrasted with developing country "actions" under the Cancun Agreements, the United States and others continue to worry that they will lose important manufacturing jobs and sales of manufactured goods to developing countries, particularly China and India with their large industrial manufacturing capabilities.

As a result, competition concerns have featured prominently in the ongoing negotiations to build a new climate regime and in domestic legislation. Almost all proposals for U.S. climate change legislation have included a provision to tax imported goods that fail to incorporate the cost of carbon in the price of the good. These "border adjustments," as such taxes are called in trade jargon, have also been proposed in EU and other legislation. At the same time, developing countries have sought the inclusion of language in the new climate regime that would prohibit such border adjustments.

Whether such border adjustments and other trade-related restrictions designed to benefit climate change are permissible may be determined by the international trading system, as administered by the members of the World Trade Organization (WTO). International trade rules, which seek to liberalize trade in goods by removing barriers to trade, provide many opportunities to mitigate climate change. For example, reductions in tariffs — the taxes imposed on imported goods as a condition of import — on climate-friendly technologies would reduce the price for these goods and encourage their use. Many developing countries, for example, impose tariffs on compact fluorescent light bulbs exceeding 20 percent *ad valorem*, adding substantially to the cost of a known technology that can significantly reduce greenhouse gas emissions. An agreement to reduce subsidies for the production of fossil fuels, estimated at US$100 billion, could significantly reduce CO_2 emissions by making fossil fuels more expensive and encourage the use of renewable energy.

Trade law also poses numerous challenges. For example, subsidies to encourage the production of solar panels may violate rules prohibiting subsidies that distort international trade. In fact, some U.S. manufacturers of solar panels have challenged China's subsidies to its solar manufacturers. Carbon taxes, depending on how they are structured, may or may not be consistent with the rules of the General Agreement on Tariffs and Trade (GATT). Requirements to use renewable energy may also violate trade rules. Japan and the European Union successfully challenged Ontario's renewable energy law, arguing that the domestic content requirements in the feed-in tariff program discriminate against foreign energy products in violation of the GATT and also constitute a prohibited subsidy. *Canada-Certain Measures Affecting the Renewable Energy Generation Sector*, Panel Report, WT/DS412/R, WT/DS426/R (published Dec. 19, 2012). Laws that impose higher taxes on automobiles with low fuel economy than on automobiles with higher fuel economy may run afoul of the GATT's nondiscrimination rules.

This chapter covers three distinct but related issues concerning international trade and climate change. First, Section II reviews the climate impacts of trade in specific goods to identify the challenges of identifying "climate-friendly" products. Second, Section III examines whether the regulation of greenhouse gas emissions places firms at a competitive disadvantage vis-à-vis firms that are not required to reduce their emissions. Third, Section IV summarizes the principal trade rules affecting climate change mitigation policies and assesses specific climate change policies, such as carbon taxes, subsidies, and renewable energy requirements, in light of trade law.

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II. CLIMATE IMPACTS OF INTERNATIONAL TRADE

The sustained growth in international trade is clearly causing CO_2 emissions to grow around the world. As products move around the world, fossil fuels are consumed. However, as discussed below, it is not always clear which products have the worst trade-related impacts on climate change.

First, the way in which products are transported is critical to determining the carbon impact of international trade because different modes of transport produce considerably different CO_2 emissions for each kilometer a metric ton of freight is transported:

Table 10-1: Carbon Dioxide Emissions for Different Modes of Transport

Mode of Transport	**CO_2 emissions (in grams/ton km)**
Truck (12 ton)	110
Truck (24 ton)	92
Truck (36 ton)	84
Maritime Shipping	14
Train	23
Plane	607

R. Andreas Kraemer et al., *What Contribution Can Trade Policy Make Towards Combating Climate Change*, 5 (European Parliament, 2007). Although maritime shipping is considerably less carbon intensive than other modes of transport, about 90 percent of world trade moves by ship. As a result, shipping produces more than 1,000 $MtCO_2$ annually, up to 3 percent of total global emissions. SUJITH KOLLAMTHODI ET AL., GREENHOUSE GAS EMISSIONS FROM SHIPPING: TRENDS, PROJECTIONS AND ABATEMENT POTENTIAL 21 (2008).

In addition, as the costs of production have risen in developed countries, many industries, particularly energy-intensive industries, have moved from developed to developing countries. As those industries have shifted to developing countries, so too have emissions of CO_2 and other greenhouse gases. For example, studies have revealed that U.S. CO_2 emissions would have been 3 percent to 8 percent higher if goods imported from China had been produced in the United

States. At the same time, exports to the United States accounted for 7 to 14 percent of China's total CO_2 emissions; China, in fact, exports about 22.5 percent of its emissions. Not only did this shift emissions from a developed country to a developing country, but the shift resulted in a net increase in CO_2 emissions of approximately 720 $MtCO_2$ because Chinese production technologies are less energy efficient and more emission intensive than U.S. production methods. Bin Shui & Robert C. Harriss, *The Role of CO_2 Embodiment in US-China Trade*, 34 ENERGY POL'Y 4063–68 (2006); Davis & Caldeira, *supra*, at 5690.

The mode of transport and the production method ultimately determine the carbon footprint of a particular product. For example, shipping steel from China to Hamburg, Germany results in CO_2 emissions 3.5 times higher than producing the same steel in Germany and transporting it by rail to a facility in Hamburg. Even though shipping produces fewer emissions than rail, Chinese production methods are much less energy efficient than German production methods. Because steel production is energy intensive, the production process in China accounts for 90 percent of steel's total emissions and almost 100 percent in Germany. Thus, due to the emissions intensity of the production process, the mode of transport is not a large factor in the overall carbon footprint of the steel. Greenhouse gas emissions do not necessarily increase simply because they are produced abroad, however; buying local may sometimes be more carbon intensive than buying foreign. Producing fertilizer in New York and sending it thousands of miles by ship and rail to Florence, Italy, for example, would produce 13 percent *less* CO_2 emissions than producing it in Ravenna, Italy, a mere 199 kilometers from Florence, because U.S. production processes are so much less emissions intensive. Perhaps most astounding, production of lamb in New Zealand is so efficient that shipping lamb from New Zealand to the United Kingdom would produce one-fourth the CO_2 emissions of producing the lamb in the United Kingdom, where more fertilizers are used. R. Andreas Kraemer et al., at 18–21.

QUESTIONS AND DISCUSSION

1. Neither the UNFCCC nor the Kyoto Protocol requires Parties to account for emissions embodied in consumed goods. As a result, when production shifts to developing countries, developed countries can show reductions in emissions even though they still use and consume the same products. Should the climate regime account for the consumption patterns of developed countries by attributing to them the CO_2 emissions from imported products?

2. In the United Kingdom, Tesco, the nation's largest retailer of food, has teamed with the Carbon Trust to create a label that shows how many grams of carbon or equivalent greenhouse gases were emitted as a result of growing, manufacturing, transporting, and storing a product. The label, now covering 120 products such as potatoes, light bulbs, and detergents, also considers the impact of preparing or using a product and then disposing of any waste. For some products, the label also compares the carbon footprint of similar products. Do you think the information Tesco and the Carbon Trust include on these labels is sufficient to inform concerned consumers about the climate impacts of the products they buy? Would you include additional information?

3. The relative climate change impact of shipping and trucking compared to rail or automobiles is likely understated when only CO_2 emissions are compared because both shipping and trucks release significant quantities of black carbon. The International Maritime Organization (IMO) is exploring strategies to reduce black carbon emissions from shipping. *See* Chapter 9, Section III.B.3.

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III. COMPETITIVENESS CONCERNS

Because the Kyoto Protocol commits only developed countries to limits on greenhouse gas emissions, many have raised concerns that those limits will place firms in developed countries at a competitive disadvantage in global markets. Former President Bush, for example, consistently claimed that the failure to control developing country emissions will hurt U.S. competitiveness. The staff of the U.S. House Committee on Energy and Commerce wrote that it is "essential" that U.S. climate change legislation include incentives for developing countries such as China and India to curb their emissions, because

> if the U.S. were to cap its own GHG emissions without corresponding action by developing nations that compete in global trade markets, the cost of producing some American products would increase relative to those manufactured in countries without emissions limits. As a result, U.S. industry and jobs might relocate to (or expand operations in) countries that do not limit the emissions of their industries, causing both the environment and the U.S. economy to suffer.

U.S. House Committee on Energy and Commerce, *Climate Change Legislation Design White Paper: Competitiveness Concerns/Engaging Developing Countries*, 1 (Jan. 2008).

The competitiveness argument has arisen frequently in the trade context. Businesses argue that regulation will drive companies to countries with less stringent regulations. Environmentalists argue that the inability to erect trade barriers against products produced with environmentally damaging production methods will encourage "pollution havens" and a "race to the bottom" as companies move production to countries with less stringent environmental controls.

Despite this talk of the competitiveness effect, its existence or its magnitude in economic terms has not become apparent, largely because pollution abatement costs are generally small compared to total operating costs. For example, pollution abatement costs for the tobacco products industry were just 0.12 percent of total costs; for fabricated metal products, 0.42 percent; for petroleum and coal products, 1.93 percent; and for all industries evaluated, an average of 0.62 percent. Håkan Nordström & Scott Vaughan, *Trade and Environment* 37 (1999), *available at* http://www.wto.org/english/news_e/pres99_e/environment.pdf.

The effects on competition resulting from climate change legislation, however, depend upon the energy intensity of the industry at issue. For most U.S. industries, climate change mitigation policies will not affect competition, because energy accounts for only a small component of total

production costs. For example, energy costs in the transportation equipment and electronics manufacturing industries account for less than one percent of total production costs and are more likely to be affected by fluctuations in currency exchange rates or national differences in tax and transportation costs. Deborah Seligsohn et al., *China, the United States, and the Climate Change Challenge* 12 (World Resources Institute Policy Brief, Oct. 2009).

The competitiveness effect for energy-intensive industries is more ambiguous. One study noted that for energy-intensive industries, such as pulp and paper, chemicals, and metallic mineral products, energy costs may reach 20 percent of total product costs. *Id.* at 12.For these industries, differences in compliance costs could lead to pressure to relocate to countries with less stringent climate change policies. *Id.* Another study, however, reached different conclusions. In a study examining 20 years of data on more than 400 U.S. manufacturing industries' shipments, trade, and employment, and their relationship to energy prices, researchers made the following conclusions:

> We find that higher energy prices, of the sort associated with pricing CO_2 at $15 per ton, would lead to an average production decline of 1.3 percent across U.S. manufacturing, but also a 0.6 percent decline in consumption (defined as production plus net imports). This suggests only a 0.7 percent shift in production overseas. There is no statistically discernible effect on employment for the manufacturing sector as a whole.
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> We also focus more narrowly on those manufacturing industries that are potentially most vulnerable because they are energy-intensive. We do this by estimating a model that allows the competitiveness effect to vary with energy intensity. We estimate that industries with energy costs exceeding 10 percent of shipment value, (e.g., metal foundries, cement, and lime) would expect output declines of about 4 percent and consumption declines of 3 percent, associated with a $15 per ton CO_2 price, suggesting a 1 percent shift overseas. The decline in consumption presumably reflects efforts to economize on the use of energy-intensive manufactured commodities in end-use products and substitution to less-energy-intensive input. This 1 percent shift — out of a 3–4 percent decline in production — illustrates that most of the domestic climate policy impacts on industry do not reflect adverse competitiveness effects at the price levels we can study. Rather, they reflect shifts in consumption patterns. While we estimate a smaller decline in domestic employment than in production from this CO_2 price, the data do not allow us to estimate how much of this represents a shift overseas (as there are no measures of "consumed or imported jobs" comparable to measures of consumed and imported goods).
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> We can apply our results to key energy-intensive manufacturing industries based on their particular energy intensity. We calculate production declines of 2.7 percent in iron and steel, 2 percent in aluminum, 1.6 percent in cement, 3.4 percent in bulk glass, and 3.3 percent in paper, associated with a $15 per ton CO_2 price. The comparable estimates of production shifts overseas range between 0.7

> percent and 0.9 percent in these industries, roughly on par with the overall manufacturing sector (more narrowly defined energy-intensive industries would expect competitiveness effects ranging from 0.3 percent to 1.8 percent). Importantly, these estimates for particular industries are based on the average for all industries with similar energy intensity; our results do not rule out the possibility that among similarly energy-intensive industries, some may be harder hit than others.

JOSEPH E. ALDY & WILLIAM A. PIZER, THE COMPETITIVENESS IMPACTS OF CLIMATE CHANGE MITIGATION POLICIES, iv–v (Pew Center on Global Climate Change, May 2009). For more on the relative climate impacts of various sectors, see Chapter 2.

If businesses do relocate to countries with less stringent climate change policies, would that have an adverse climate impact? As with the competition effect, the answer seems to be probably not.

> To begin with, in the US economy the energy-intensive industries account for only 6% of total GHG emissions, so the climate impact of leakage from these industries would be modest at best. Moreover, most economic analyses find only a modest percentage of emission reductions in developed countries would be offset by emission increases in developing countries in the same industries. For example, an analysis of a bill in the US Congress performed by the US Environmental Protection Agency concluded that only about 8–11% of emission reductions in the US would be offset by emission increases in other countries. Leakage rates in other studies fall in a similar range. Moreover, one study demonstrates convincingly that "the developing countries from which these [energy-intensive] goods are imported [into the US] are, in many industries, less carbon-intensive on average than the United States." From a global climate change mitigation perspective, then, industrial leakage from the United States is not a major concern.

Sanford E. Gaines, *Considering WTO Law in the Design of Climate Change Regimes beyond Kyoto*, 8 EARTH & ENVIRONMENTAL SCIENCE 11 (IOP Conf. Series, 2009).

QUESTIONS AND DISCUSSION

1. The Pew Center on Global Climate Change cautions that attempts to address competitiveness concerns across a broad spectrum of industries are likely to be inefficient due to the small competitiveness effect on the manufacturing sector as a whole. Instead, they argue that policies should target only those "energy-intensive industries" that are most vulnerable to competition. Moreover, efforts should be made to mitigate the adverse effects on these industries while keeping them within a regime to reduce emissions rather than benefit such industries by excluding them from the regulatory regime. ALDY & PIZER, *supra*, at 30. Do you agree? How would you define an "energy-intensive industry"? Does the small size of the emissions of

energy-intensive industries relative to total U.S. emissions have any bearing on how you would address competition?

2. As a policymaker, what policies would you use to address competition concerns? To date, policymakers have focused on two domestic strategies. First, policies could limit compliance costs for energy-intensive industries by allocating low-cost or no-cost emissions allowances to reimburse exposed sectors for the costs of complying with the legislation. While such policies may shield industries from climate-based competitiveness concerns, they must be coupled with incentives to reduce emissions. Moreover, such policies should also ensure that the price of energy-intensive goods rises, because the rise in price will lead not necessarily to a shift in production to foreign countries but rather a shift in consumption away from carbon-intensive goods. "This shift away from carbon-intensive goods represents cost-effective emission reductions." *Id.*

Second, policies could increase costs on foreign producers that do not face requirements to reduce CO_2 and other greenhouse gas emissions. These trade-based measures are designed to impose costs on such foreign producers through tariffs or other measures applied to imported goods that are similar to the compliance costs faced by domestic producers. This is the policy approach embraced in proposed U.S. climate change legislation. *See, e.g.*, American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009) (passed by the U.S House of Representatives, June 26, 2009). As discussed in the next section, this approach is confrontational and not surprisingly has met resistance from developing countries. Laws based on this approach must also be structured carefully to avoid inconsistencies with WTO rules.

IV. INTERNATIONAL TRADE RULES AND CLIMATE CHANGE POLICY

Since the emergence of the "trade and environment" debate in the early 1990s, the international community has wrestled with how to integrate the trade liberalization rules of trade agreements with the use of trade restrictions to protect the global environment, particularly those found in multilateral environmental agreements. Should the rules of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which ban trade for primarily commercial purposes in highly endangered species such as blue whales, gorillas, and many other species, be exempt from trade rules? Should the Montreal Protocol's bar on trade in ozone depleting substances with non-Parties be exempt? The trade community, through the WTO, has debated these questions extensively. In fact, the WTO ministers have directed the WTO's Committee on Trade and Environment to negotiate, as part of the current round of trade negotiations known as the "Doha Round," an outcome to "the relationship between existing WTO rules and specific trade obligations" of multilateral environmental agreements. World Trade Organization, Ministerial Declaration of 14 November 2001, WT/MIN(01)/DEC/1, para. 31(i) (Nov. 14, 2001). The resolution of these questions, however, has been tied up with many other issues, such as agricultural subsidies, that are part of the Doha Round. For more on this subject, see CHRIS WOLD, SANFORD GAINES, & GREG BLOCK, TRADE AND THE ENVIRONMENT: LAW AND POLICY 641–705 (2d. ed. 2011).

The UNFCCC and the Kyoto Protocol recognize that climate change policy may provide opportunities as well as challenges for the international trading system. Article 3.5 of the UNFCCC states that "Parties should cooperate to promote a supportive and open international economic system" and that climate change mitigation policies "should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade." Article 2.1 of the Kyoto Protocol calls on Parties to reduce or phase out market imperfections, fiscal incentives, tax and duty exemptions, and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention. Article 2.3 further directs Parties to implement policies to minimize adverse effects on international trade. As the following discussion of specific climate change mitigation policies makes clear, the ambiguity of international trade rules makes it difficult for Parties to know just when they are adopting measures that run counter to WTO rules.

A. An Introduction to International Trade Rules

The WTO administers a number of agreements covering trade in goods and services (e.g., telecommunications and provision of electricity), and disciplining the use of product standards (e.g., fuel efficiency and toxicity limits, as well as some ecolabels), intellectual property rights, and subsidies, among other things. Unlike the climate change regime and other multilateral environmental agreements, the WTO provides for compulsory dispute settlement through which prevailing parties may impose sanctions against losing parties that do not comply with the decisions of the WTO dispute settlement panels or the WTO Appellate Body.

The GATT is the principal WTO agreement governing trade in goods. Originally adopted in 1947, the GATT is designed to ensure the efficient allocation of the world's economic resources by reducing barriers to trade and leveling the conditions for trade in goods. To achieve this goal, the GATT requires each country to bind itself to maximum tariffs that it applies equally to all members. In this regard, the GATT has succeeded; GATT contracting parties (now called WTO members) have reduced tariffs on manufactured goods of industrial countries from an estimated 40 percent in 1947 to 3.9 percent today.

1. *The GATT's Core Obligations*

The GATT imposes a number of obligations on WTO members to prevent them from using nontariff barriers — taxes, administrative procedures, and other laws and regulations — to protect domestic industries from foreign competition. Three of these obligations are at the center of trade-environment disputes as well as the design of climate change policies.

First, the most favored nation (MFN) obligation of Article I requires each WTO member to tax and regulate imported "like products" from all other WTO members the same. For example, Mexico may not tax solar panels from Germany less than solar panels from Japan. Second, the national treatment principle of Article III requires a country to tax and regulate imported products "no less favourably" than "like" domestic products. Thus, the United States may impose a tax on imports of HFC-23, a powerful greenhouse gas, provided that the tax rate is no

more than the tax imposed on domestically-produced HFC-23. Third, Article XI prohibits members from applying any restrictions, such as quotas and licensing schemes, other than tariffs on the importation or exportation of products. Thus, as explored below, the U.S. embargo on Mexican tuna in the *Tuna/Dolphin I* dispute violated Article XI.

A central question for both the MFN and national treatment nondiscrimination obligations is whether the trade measure relates to "like products." Quite obviously, governments may tax and regulate wind turbines differently from automobiles and coal differently from solar panels. At some point, however, products become so similar that trade rules demand equal tax and regulatory treatment to ensure fair competition in the global marketplace. The issue of "like products" raises difficult questions. Is electricity from coal the same as electricity from wind power? Are hybrid, electric, and traditional gas-powered automobiles like products that require equivalent tax and regulatory treatment?

WTO dispute settlement panels make determinations of whether products are "like products" by assessing, on a case-by-case basis, the following four factors: (1) the product's end-uses in a given market; (2) consumers' tastes and habits, which change from country to country; (3) the product's properties, nature and quality; and (4) tariff classification of the products in question. *Japan-Taxes on Alcoholic Beverages*, Appellate Body Report, WT/DS8/AB/R, WT/DS10/AB/R, WT/DS11/AB/R, 17–18 (published Oct. 4, 1996) (adopted Nov. 1, 1996) ("Japan-Alcoholic Beverages II"). The simplicity of this four-part test masks the complexities of the national treatment obligation, which alters the meaning of "likeness" depending on the circumstances. For example, panels have defined "like products" narrowly with respect to taxes, provided they are not imposed to protect domestic production. If that condition is met, then natural gas and coal, because of their different physical characteristics, are probably not like products despite their similar end uses. They could be taxed differently. However, taxes designed to afford protection to domestic production expand the concept of like products to include "directly competitive and substitutable products." Under this expanded concept of likeness, the WTO's Appellate Body has found shochu, whisky, brandy, rum, gin, genever, and liqueurs to be "directly competitive and substitutable." *Id.* at 27. For regulatory measures, the definition of "like product" fits somewhere between these two points but significantly closer to the broader reading of "directly competitive and substitutable products."

Whatever ambiguity exists in the interpretation of "like products," trade panels have been absolutely clear that factors unrelated to the product as a product cannot be used as the basis for taxing or regulating products differently. Thus, in the *Tuna/Dolphin* disputes, the panels found U.S. import restrictions on tuna to be impermissible because the basis for barring imports into the United States related to the way the fish were caught, not some physical characteristic of the tuna itself. Processes and production methods (PPMs), such as fish harvesting techniques that do not affect the product as a product (non-product related PPMs), cannot be used to distinguish otherwise like products for tax and regulatory purposes. *United States- Restrictions on Imports of Tuna*, GATT Panel Report, DS21/R (Sept. 3, 1991) (unadopted), *reprinted in* 30 I.L.M. 1594 (1991) (*Tuna/Dolphin I*). Similarly, a panel found U.S. rules that imposed different requirements on foreign gasoline than domestic gasoline impermissible because those rules related to data held by a foreign company, not the gasoline itself. *United States-Standards for Reformulated and*

Conventional Gasoline, Panel Report, WT/DS2/R) (published Jan. 29, 1996) (adopted as modified by the Appellate Body, May 20, 1996)(decided on Jan. 29, 1996). On the other hand, product-related PPMs, such as irradiation and pasteurization, may be used to distinguish products for tax and regulatory purposes (that is, pasteurized milk may be taxed and regulated differently from nonpasteurized milk). As described below, these rulings complicate efforts to tax or regulate climate-friendly technologies more favorably than other products.

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2. *The GATT's Environmental Exceptions*

The GATT also includes exceptions to these core rules, two of which are relevant to the environment and climate change. GATT Article XX creates exceptions to the GATT rules for measures

- "necessary for the protection of human, animal or plant life or health" (Article XX(b)), or
- "relating to the conservation of exhaustible natural resources" (Article XX(g)).

In addition, such measures must be applied in a manner that avoids "arbitrary or unjustifiable discrimination" in trade and it must not constitute a "disguised restriction" on trade.

Whether a measure is "necessary" within the meaning of Article XX(b) is determined by weighing and balancing a number of factors. Under this test, a trade panel assesses (1) the relative importance of the interests or values furthered by the challenged measure, (2) the contribution of the measure to the realization of the ends pursued by it, and (3) the restrictive impact of the measure on international commerce. If this analysis yields a preliminary conclusion that the measure is necessary, then a trade panel must confirm the measure's necessity by comparing the measure with less trade restrictive alternatives that still provide an equivalent contribution to the achievement of the objective pursued. *Brazil-Measures Affecting Imports of Retreaded Tyres*, Appellate Body Report, WT/DS332/AB/R, paras. 141–56 (published Dec. 3, 2007) (adopted Dec. 17, 2007) ("Retreaded Tyres").

In two disputes in which human health was at issue, WTO panels agreed that certain measures met the GATT exception's "necessary" standard. In the *Asbestos* dispute, a WTO panel concluded that France's import ban on carcinogenic asbestos products was necessary to protect human health. *European Communities-Measures Affecting Asbestos and Asbestos-Containing Products*, Panel Report, WT/DS135/R, ¶¶ 8.184–8.212 (published Sept. 18, 2000) (adopted Apr. 5, 2001). Another panel concluded that Brazil's ban on retreaded tires was necessary to protect human health from malaria, yellow fever, and other mosquito-borne illnesses (mosquitoes breed in water that collects in improperly disposed tires). Retreaded Tyres, at paras. 141–56. However, as discussed below, just because a measure is "necessary" does not mean it meets all requirements of GATT Article XX.

The second environmental exception, the "Article XX(g) exception," allows measures "relating to" the conservation of an exhaustible natural resource, provided that similar

restrictions are imposed on domestic production or consumption of that resource. Trade panels have found that "relating to" requires a "substantial relationship" between the measure and the objective pursued or "a close and genuine relationship of ends and means." In addition, this exception specifically requires that similar measures apply to domestic production or consumption. Trade panels have said that this is simply a requirement of "even-handedness." *United States-Standards for Reformulated and Conventional Gasoline*, Appellate Body Report, WT/DS2/AB/R, 19–21 (published Apr. 29, 1996) (adopted May 20, 1996) ("Reformulated Gasoline"); *United States-Import Prohibition of Certain Shrimp and Shrimp Products*, Appellate Body Report, WT/DS58/AB/R, paras.136, 143–45 (published Oct. 12, 1998) (adopted Nov. 6, 1998) ("Shrimp/Turtle").

In the *Shrimp/Turtle* dispute, for example, a WTO panel ruled that U.S. import restrictions on shrimp from countries that did not adopt sea turtle conservation measures for their shrimp fisheries related to the conservation of sea turtles. Shrimp/Turtle, Appellate Body Report, at paras.127–45. Similarly, a trade panel concluded that U.S. rules for establishing baseline levels of pollutants in gasoline related to the conservation of clean air — an exhaustible natural resource. Reformulated Gasoline, at 14–22.

While WTO panels have interpreted these exceptions broadly enough that environmental measures routinely are found to meet the requirements of the relevant exception, very few environmental measures have been found to meet the general requirements of the "chapeau" of GATT Article XX. In order for a country to establish that its trade measures qualify as an exception to the general GATT rules, those measures must be applied in a way that avoids "arbitrary or unjustifiable discrimination" in trade, and they must not constitute a "disguised restriction" on trade.

The *Shrimp/Turtle* dispute provides an excellent illustration of how the "chapeau" operates. There, a WTO panel ruled that the United States could not prohibit the importation of shrimp from several Asian countries just because those countries did not use turtle excluder devices (TEDs) — equipment that permits sea turtles to escape from a shrimp net. As in the *Tuna/Dolphin* dispute, the panel ruled that the import ban violated GATT Article XI because the United States distinguished shrimp based on the way it was caught, not on characteristics of the shrimp itself. The panel then ruled, pursuant to Article XX(g), that the U.S. shrimp embargo related to the conservation of exhaustible natural resources — turtles were clearly an exhaustible natural resource, and the United States imposed sea turtle conservation measures on its own shrimpers. Shrimp/Turtle, at paras. 161–84.

However, the panel concluded that the shrimp embargo did not meet the requirements of the Article XX chapeau. The panel ruled that the shrimp embargo constituted arbitrary and unjustifiable discrimination because the United States required the exporting country to "adopt essentially the same policies and enforcement practices" as those applied to, and enforced on, domestic producers. In other words, because the United States did not take into account the unique environmental and other circumstances of the shrimp fisheries in foreign countries, it unfairly discriminated against some of its trading partners. The panel also concluded that the United States arbitrarily discriminated against Asian countries by not attempting to negotiate an

international agreement to resolve shrimp-turtle issues with them, which the United States had done with Latin American countries. Also, the failure of the United States to provide countries with a formal process for appealing decisions to ban the importation of shrimp amounted to arbitrary discrimination.

In a subsequent shrimp/turtle dispute, a WTO panel found that the United States did meet the requirements of the chapeau. The panel based its conclusion on three main points. First, after the decision in the first *Shrimp/Turtle* dispute, the United States had attempted good-faith international negotiations to resolve the issue with shrimp-producing countries. Second, the United States had revised its requirements for importing shrimp. Instead of requiring exporting countries to adopt essentially the same sea turtle conservation policies as applied to U.S. shrimpers, the United States required exporting countries to adopt a program *comparable in effectiveness* to the U.S. program. The panel found that this requirement allowed sufficient flexibility to avoid "arbitrary or unjustifiable discrimination." Third, the United States adopted formal procedures for foreign countries to challenge the findings of the United States. *United States-Import Prohibition of Certain Shrimp and Shrimp Products: Recourse to Article 21.5 of the DSU by Malaysia*, Appellate Body Report, WT/DS58/AB/RW, paras. 122–50 (published Oct. 22, 2001) (adopted Nov. 21, 2001).

The WTO's Appellate Body has also stated that a measure may only be justified under the Article XX exceptions if the arbitrary or unjustifiable discrimination relates to the objective of the measure. The Appellate Body concluded that there is arbitrary or unjustifiable discrimination "when a Member seeks to justify the discrimination resulting from the application of its measure by a rationale that bears no relationship to the accomplishment of the objective that falls within the purview of one of the paragraphs of Article XX, or goes against this objective." Brazil-Retreaded Tyres, Appellate Body Report, at para. 246. Thus, although Brazil sought to bar all imports of retreaded tires, a trade panel under MERCOSUR (a customs union of several South American countries) ruled that Brazil must accept such tires from MERCOSUR members. When Brazil sought to use the MERCOSUR decision to justify the difference in treatment between retreaded tires from MERCOSUR members and those of all other countries, the Appellate Body found that discrimination arbitrary and unjustifiable. According to the Appellate Body, that justification bore no relationship to the goal of preventing malaria and other mosquito-borne diseases, the principal reason offered by Brazil for barring the importation of retreaded tires.

QUESTIONS AND DISCUSSION

1. In addition to the GATT, the WTO also administers agreements relating to services and product standards. These agreements adopt the central nondiscrimination obligations of the GATT. For example, the General Agreement on Trade in Services and the Agreement on Technical Barriers to Trade (TBT Agreement) both require application of the most favored nation and national treatment obligations. They also adopt other rules that are relevant for climate change. For example, the TBT Agreement provides that technical regulations — those laws or regulations specifying mandatory product characteristics, such as fuel economy standards or emissions limits — "shall not be more trade-restrictive than necessary to fulfill a legitimate

objective." In addition, the Agreement on Subsidies and Countervailing Measures (SCM Agreement) prohibits certain subsidies that distort international trade by, among other things, suppressing world prices of goods.

2. *Tariff Reductions.* As part of the current Doha Round of negotiations, WTO members have agreed to reduce or eliminate tariffs on environmental goods and services. World Trade Organization, Ministerial Declaration of 14 November 2001, WT/MIN(01)/DEC/1, para. 31(iii) (Nov. 14, 2001). A wide range of climate change-related technologies, including wind turbines, solar panels, geothermal energy sensors, and fuel cells, could be considered environmental goods. Reducing or eliminating tariffs on these technologies would reduce their cost and encourage their use and dissemination. A World Bank report concluded that removing tariffs on four basic clean energy technologies (wind, solar, clean coal, and efficient lighting) in 18 of the high-GHG-emitting developing countries could result in trade gains of up to 7 percent (and up to 14 percent if nontariff barriers are also removed). WORLD BANK, INTERNATIONAL TRADE AND CLIMATE CHANGE 45–72 (2008). If translated into emissions reductions, these gains suggest that — even within a small subset of clean energy technologies and for a select group of countries — the impact of trade liberalization could be significant.

Nonetheless, WTO members have not been able to agree on the list of qualified goods and services; defining what are "environmental" goods and services has proven more challenging than it appears. Consider two approaches in the climate change context. Under the first approach, climate change mitigation technologies (and services) would be defined in relation to a specific good or end-use. Thus, goods such as solar photovoltaic panels and wind turbines would be slated for tariff reduction or elimination. The second approach would cast a wider net and include "environmentally preferable products" from a climate change perspective. Under this approach, a product that causes less harm to climate than alternative products would be subject to tariff reduction or elimination. Mahesh Sugathan, *Climate Change Benefits from Liberalisation of Environmental Goods and Services*, *in* LINKING TRADE, CLIMATE CHANGE AND ENERGY 8 (ICTSD 2006). The trouble with this second approach is determining exactly when a product is more climate change friendly than an alternative product. For example, corn-based ethanol may or may not result in lower greenhouse gas emissions than fossil fuels; it depends on how much of the production life cycle is included in the calculation, how the corn was grown, and how the ethanol was produced. Bruce A. Babcock et al., *Is Corn Ethanol a Low-Carbon Fuel?*, IOWA AG REV., Fall 2007, at 1–3, 10. In addition, use of corn-based ethanol results in much higher emissions than sugarcane-based ethanol. Moreover, technology developments may make both substantially inferior products to cellulosic ethanol. If current technologies receive preferential treatment such as a zero tariff, then it will be difficult, if not impossible, to provide more beneficial trade advantages to future, superior technologies. The same problems hold true for attempts to reduce tariffs for appliances and other products that are energy efficient. In addition, the establishment of separate tariffs for specific products, such as energy efficient dishwashers, would require governments to establish a new tariff classification. Sugathan, at 8–9. Because many industries vigorously defend their tariff preferences and protections, this option may be politically difficult to achieve. Another concern with both approaches for many countries is that a reduction in tariffs to benefit a specific technology may lead to a tariff reduction for technologies unrelated to climate change. For example, India classifies solar photovoltaic panels

as "Other" under the subclassification of light emitting diodes (LEDs). An effort to reduce tariffs for solar photovoltaic panels may thus lead to a tariff reduction in all "Other" LEDs. While India could always reclassify photovoltaic panels, the example highlights why the negotiations are not straightforward.

Despite these challenges, do you think that governments should establish lists of climate-friendly goods and pursue tariff elimination for them? If yes, which approach do you prefer? Which products do you think deserve reduced tariffs?

3. The negotiations to reduce tariffs on environmental goods and services are taking place within the WTO. Should the WTO be involved at all in such negotiations? Should the Parties to the climate change regime negotiate their own tariff reductions for climate-friendly goods and services? What are the advantages of having these negotiations within the WTO? Within the climate change regime?

4. In light of the slow progress within the WTO on environmental matters, as well as the general difficulty of negotiating with more than 150 WTO members, some have begun to argue that reductions in tariffs and nontariff barriers for climate change technology should occur through bilateral and regional trade agreements, such as the North American Free Trade Agreement. In 2012, for example, the Asia-Pacific Economic Cooperation forum (APEC), whose twenty-one members include the United States, agreed to reduce applied tariff rates to 5% or less by the end of 2015 on a range of environmental goods. Many of these goods will benefit climate change, including biomass boilers, parts that are integral components to wind turbines, and solar water heaters, among other products. APEC, 20th Economic Leaders' Declaration, APEC List of Environmental Goods, at Annex C, Sept. 8–9, 2012. What are the advantages and disadvantages of negotiating with a small group of countries rather than the larger WTO membership?

B. Carbon and Other Taxes

Governments have proposed or adopted a variety of taxes — gas taxes, automobile taxes, and carbon taxes — to help mitigate climate change, to meet their commitments under the Kyoto Protocol, or simply to generate revenue. Several European countries, including Norway, Finland, and the Netherlands, have imposed carbon taxes since the 1990s. More recently, Australia set a fixed carbon tax of Aus$23 (US$23.78) per metric ton on the top 500 polluters from July 2012 (the program converts to an emissions trading scheme in July 2015). British Columbia requires purchasers and users of fossil fuels to pay Can$30 (US$30.24) per ton of carbon dioxide-equivalent. In general, a WTO member is free to impose these taxes on its domestic industry without implicating WTO rules, because no international trade concerns are raised.

However, in the absence of a similar tax in the markets of competitors, a government and its industries may feel that the untaxed imported products have an unfair, competitive advantage in the marketplace. When both domestic and foreign products are taxed, some of these taxes, such as a tax on fuel consumption, are unlikely to raise trade concerns, provided that imported and foreign gas are taxed the same. Other taxes, such as those based on fuel efficiency, pose greater

challenges under trade law because they may discriminate between "like products."

1. *Automobile Taxes*

A number of countries impose some form of "gas guzzler" tax, a tax on automobiles based on the vehicle's fuel economy. For example, under the U.S. Energy Tax Act of 1978, the United States imposes taxes that increase as the fuel economy of a vehicle decreases. 26 U.S.C. §§ 4064 et seq. *See also* Chapter 16, Section II.A.2. Cars with an average fuel economy greater than 22.5 miles per gallon have no tax imposed on them. Cars getting between 21.5 and 22.5 miles per gallon have a tax imposed on them of $1,000. The tax increases as fuel economy decreases with cars getting fewer than 12.5 miles per gallon assessed a tax of $7,700. Currently, sport utility vehicles and trucks, including light-duty trucks, are exempt.

Whether such laws are consistent with the GATT depends on whether cars, irrespective of their fuel economy, are "like products." When the European Communities challenged the U.S. gas guzzler tax in the 1990s, a GATT panel upheld the tax. *United States-Taxes on Automobiles*, GATT Panel Report, DS31/R (Oct. 11, 1994) (unadopted). The GATT Parties never adopted that decision, however, a step required for the decision to be binding on the disputing parties. Moreover, the panel failed to use the four-part "like product" test described above, to assess whether cars with high and low fuel economy were "like products." *See* Japan-Alcoholic Beverages, Appellate Body Report; United States-Standards for Reformulated and Conventional Gasoline, Appellate Body Report, WT/DS2/AB/R (decided Apr. 29, 1996) (adopted May 20, 1996). As a result, whether tax distinctions based on a car's fuel economy are permissible remains unclear.

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2. *Carbon Taxes*

Many governments believe that a carbon tax — based on the carbon content of fossil fuels or the CO_2 emitted in manufacturing a product — provides an attractive means for reducing emissions, creating appropriate market incentives for switching to cleaner fuels, and encouraging energy efficiency. Representative Fortney Stark's Save Our Climate Act of 2009 (H.R. 594) proposed a tax of $10 per ton of carbon in natural gas, coal, and other fossil fuels. The tax would have increased by $10 per year until U.S. CO_2 emissions reach 20 percent of 1990 emissions. Similarly, Representative John Larson's America's Energy Security Trust Fund Act of 2009 (H.R. 1337) proposed a tax of $15 per ton on the CO_2 content of fossil fuels extracted, manufactured, or produced in the United States or imported into the United States for consumption, use, or warehousing.

If a carbon tax is based on the carbon content of the product, like Representative Stark's bill, or the average BTUs per unit of the fossil fuel, then the carbon taxes should be consistent with the GATT. Under these circumstances, the tax would be based on a physical characteristic of the product, thus avoiding the problem the United States encountered in the *Tuna/Dolphin* disputes discussed above. The GATT should also allow a higher tax to be imposed on coal with a higher carbon content than coal with a lower carbon content. Although this appears to be a violation of

the rule that prohibits taxing like products differently, here the taxed item is the carbon, not the coal. This arguably avoids any discrimination or "like product" concerns by taxing the carbon in the product, not the product itself. Similar taxes, such as those based on the alcohol content in perfumes and the amount of certain chemicals in other substances, have been upheld by trade panels. In the *Superfund* dispute, for example, a GATT panel allowed the United States to tax the amount of "certain chemicals" that were constituents of other substances, so long as the tax was based on the amount of chemicals in the final product and not the value of the final product. *United States-Taxes on Petroleum and Certain Imported Substances*, GATT Panel Report, L/6175, BISD, 34th Supp. 136, para. 5.2.8 (1988) (adopted June 17, 1987) (*Superfund*). The panel upheld the tax because it was imposed on "an article from which the imported product has been manufactured or produced in whole or in part," as allowed by Article II:2(a) of the GATT. Although the energy or carbon naturally found in a product is not used to "manufacture or produce" the final energy product, a tax on the energy or carbon content of the product would seem to be sufficiently analogous because the tax is on some embedded element of the product.

In contrast, taxes on carbon emissions resulting from the production of imported goods would violate the GATT under current jurisprudence. Such taxes, like all taxes on pollution discharges or process and production methods, constitute taxes on the manufacturing process, not the product itself. This is the lesson from the *Tuna/Dolphin* dispute. In that case, the GATT panel concluded that U.S. restrictions on the importation of tuna caught by encircling dolphins violated the GATT's prohibition against import restrictions, because the United States was impermissibly distinguishing products based on the way the tuna was produced, not on some characteristic of the product itself. In essence, all tuna were "like products," and import restrictions based on the method of harvest or production are not allowed. Taxes based on carbon emissions would likely be treated the same way.

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3. *Taxes on Products Made with Fossil Fuels*

Instead of taxing coal or natural gas, a tax could be imposed on the production of chairs, computers, and any other manufactured product based on the amount of energy consumed during the production process, from operating the machinery to heating and lighting the factory where the product is made. While such a tax on energy inputs would strongly encourage energy efficiency throughout the entire production cycle, such taxes when imposed on imported products may not be consistent with the GATT.

Under the GATT, taxes on energy, transportation, and equipment used in production are neither "indirect" nor "direct" taxes; they are *taxes occultes*. As such, they are not impermissible taxes on processes or production methods, such as taxes based on emissions during production of the good, or U.S. restrictions on tuna or shrimp based on the harvest method. At the same time, they are not considered taxes relating to the product itself, which would be a permissible tax and eligible for a border tax adjustment (discussed in greater detail below).

Although the GATT has discussed these taxes within the context of border tax adjustments, it has concluded only that there is a "divergence of views" on whether *taxes occultes* are eligible

for border tax adjustment. *Border Tax Adjustments*, Dec. 2, 1970, GATT Doc. L/3464, BISD 18th Supp. 97, paras. 14–15. (1972). A number of authors have parsed the distinctions among various taxes to determine whether taxes on products made with energy products are eligible for border tax adjustments. These analyses, which are very complex and require a sophisticated understanding of the WTO's Agreement on Subsidies and Countervailing Measures, come to different conclusions about the eligibility of such taxes for border tax adjustments. *See* Thomas J. Schoenbaum, *International Trade and Protection of the Environment: The Continuing Search for Reconciliation*, 91 AM. J. INT'L. L. 268, 310 (1997) (concluding that taxes on imports are not permissible but rebates on exports are); Paul Demaret & Raoul Stewardson, *Border Tax Adjustments under GATT and EC Law and General Implications for Environmental Taxes*, 28 J. WORLD TRADE 5 (1994); Frank Muller and Andrew Hoerner, *Using A Border Adjustment To Take The Lead On Climate Change Without Encouraging Runaway Shops*, *in* US CLIMATE ACTION NETWORK HOTLINE 1, 5 (Sept. 1997).

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C. Border Tax Adjustments and Border Adjustments

To ensure that domestic products enter international commerce on a level playing field, not only do countries impose taxes on imported "like" products, but they also exempt or rebate the tax on the domestic product when it is exported. Such "border tax adjustments" were a feature of the Stark and Larson bills. They are also perhaps the most controversial taxes from a trade perspective. In 1993, President Clinton proposed an energy tax that would have taxed imported products similarly to domestic products and rebated the tax for domestic products that were exported. The proposal was rejected when European and Japanese producers objected that the proposal violated the GATT. *See* DANIEL C. ESTY, GREENING THE GATT: TRADE, ENVIRONMENT, AND THE FUTURE 168 (1994).

Although trade objections stopped the Clinton proposal, border tax adjustments of carbon taxes may in fact be consistent with GATT rules. Consider the Stark and Larson bills, which would have exempted sales of "taxable fuels" for export from the carbon tax. As described above, the United States or another WTO member should be able to tax imported products, provided that imported products are taxed the same as domestic products. The only remaining question is whether a WTO member can exempt or rebate the tax for domestic products destined for export. The question hinges on whether the tax is an "indirect tax" (also called a product tax), such as a sales, excise, value-added, or other tax on a product, or a "direct tax," a tax not directly levied on products, such as an income, social security, or payroll tax. Under GATT rules, only indirect taxes are eligible for border tax adjustment. Because a tax on carbon content relates to some physical characteristic of the product, it should be considered an indirect tax and thus eligible for a border tax adjustment.

While countries have proposed such border tax adjustments for fuels, no country has actually adopted one (interestingly, Sections 4681 and 4682 of the U.S. Internal Revenue Code impose an excise tax on the sale or use of ozone depleting substances (ODS) by the manufacturer, producer or importer of the ODS).

A variation of the border tax adjustment has emerged in various cap-and-trade proposals that could be described more generally as "border adjustments." For example, the American Clean Energy and Security Act of 2009, H.R. 2454, included a proposal that would have required importers to purchase GHG emission allowances from an "international reserve" in an amount equal to the emission reduction credits associated with producing a like product from a U.S. company subject to cap-and-trade emission reductions; importers would buy the allowances at a price equal to the U.S. market price for domestic emission reduction credits. The bill, which never became law, created exemptions for products originating in least developed countries, countries with emissions of less than 0.5 percent of the global total, and countries with equivalent carbon reduction requirements. This particular proposal clearly violates the GATT's most favored nation obligation, because some imported products would not be subject to the requirement to purchase allowances. In addition, because the border adjustment distinguishes products based on the way they are produced, it would also likely be deemed a restriction on the importation of a product in violation of GATT Article XI, just as U.S. restrictions on tuna were in *Tuna/Dolphin I*. Whether such a border adjustment can be justified under a GATT Article XX exception would depend on its overall design. The outcome of such a challenge to such a border adjustment would likely hinge on whether a WTO dispute settlement panel concludes that the measure constitutes "arbitrary or unjustifiable discrimination" between imported products from two different countries or between imported and domestic products.

QUESTIONS AND DISCUSSION

1. As a legislator, you decide to encourage the sale of electric and hybrid vehicles over traditional gas-powered vehicles. You do so by imposing a tax of $3,000 on the sale of gas-powered vehicles, $500 on the sale of hybrid vehicles, and no tax on electric vehicles. Do you think that electric, hybrid, and gas-powered vehicles are all "like products" based on the vehicles' end use, physical characteristics, and tariff classification, as well as consumer preferences? Would it be better to distinguish low mileage vehicles from high mileage vehicles, regardless of the engine type?

2. Recall that the U.S. Environmental Protection Agency (EPA) concluded that only about 8 to 11 percent of emission reductions in the United States resulting from climate change legislation would be offset by emission increases in other countries. The EPA also concluded that the border adjustment described above would only decrease leakage by about half a percentage point. ENVIRONMENTAL PROTECTION AGENCY, EPA ANALYSIS OF THE LIEBERMAN-WARNER CLIMATE SECURITY ACT OF 2008: S. 2191 IN 110TH CONGRESS 5, 84 (Mar. 14, 2008).

3. Consider again the discussion of carbon taxes in Chapter 2, as well as some of the environmental and economic benefits of various taxes discussed below.

Gas Taxes. An assessment of a large number of studies on gas taxes concluded that a tax that increases the price of gas by 10 percent will cause demand for gas to fall by 5.8 percent in the long run (defined as longer than one year). Molly Espey, *Explaining the Variation in Elasticity Estimates of Gasoline Demand in the United States: A Meta-Analysis*, 17 ENERGY J. 49–60

(1996). Another meta-analysis concluded that a long-term increase in fuel prices of 10 percent would result in a decrease in fuel consumption of about 2.5 percent within a year and more than 6 percent in the longer run. Phil Goodwin et al., *Elasticities of Road Traffic and Fuel Consumption with Respect to Price and Income: A Review*, 24 TRANSPORT REVIEWS 275, 278 (2004).

Automobile Taxes. Taxes such as gas guzzler taxes may create market incentives for improving fuel economy. For consumers, adding $7,700 to the cost of a car no doubt provides a powerful disincentive for its purchase. For producers, improving fuel economy may be cheaper than incorporating the tax into the price of the vehicle. The Union of Concerned Scientists has reported that investments to increase fuel economy pay off if gas guzzler taxes are applied. For example, the Ford Explorer gets 19.3 miles per gallon. While currently exempt from gas guzzler taxes, the Explorer would be assessed a tax of $2,100 if the gas guzzler tax applied. However, a $700 investment in existing technologies could improve its fuel efficiency to 28.4 mpg, and the gas guzzler tax would not be applied to the Explorer with this mileage improvement. JASON MARK, GREENER SUVS: A BLUEPRINT FOR CLEANER, MORE EFFICIENT LIGHT TRUCKS 3–5 (1999). Another study concluded that typically 95 percent or more of the increase in fuel economy is the result of technology and only about 5 percent is due to consumers choosing different vehicle makes and models based on the vehicle's fuel economy. David L. Greene et al., *Feebates, Rebates and Gas-guzzler Taxes: A Study of Incentives for Increased Fuel Economy*, 33 ENERGY POL'Y, 757, 769 (2005). While consumers will respond to changes in vehicle price, an automobile tax will be more effective if it is designed in a way that encourages automobile producer's to adopt technological changes across a range of vehicles rather than relying on individual consumers to purchase more fuel-efficient vehicles.

Emissions Taxes. Because the ratio of CO_2 emissions to carbon content of the fossil fuel is virtually the same for all uses of fossil fuels, one goal of climate policy is to encourage the transition to fuels with lower carbon content and to technologies that reduce CO_2 emissions. Taxes on carbon emissions may encourage technological innovation more than taxes on carbon content of energy inputs. A tax on carbon content should discourage use of energy products with high carbon levels, such as coal, but without necessarily leading to technological advances to reduce CO_2 emissions significantly since known technologies exist for use of natural gas and other fossil fuels with lower carbon content. On the other hand, a tax on CO_2 emissions may lead polluters to seek effective technologies for reducing CO_2 emissions, such as carbon capture and sequestration technologies, that would allow them to continue to use cheaper fossil fuel sources knowing that their emissions can be reduced or eliminated (and thus not taxed). Moreover, economists claim that taxes on externalities from processes and production methods, such as emissions, are more efficient than taxes on products, because the price of the good will better reflect total social costs. Charles S. Pearson & Robert Repetto, *Reconciling Trade and Environment: The Next Steps, in* TRADE AND ENVIRONMENT COMMITTEE OF THE NATIONAL ADVISORY COUNCIL FOR ENVIRONMENTAL POLICY AND TECHNOLOGY, THE GREENING OF WORLD TRADE 83, 96 (1993).

Border Tax Adjustments. Carbon taxes accompanied by border tax adjustments appear to reduce greenhouse gas emissions more effectively than carbon taxes without border tax

adjustments. In one study, significant leakage — the portion of cuts in greenhouse gas emissions by countries with targets and timetables that may reappear in other countries not bound by such limits — occurred when modelers imposed a tax of 15 euros per metric ton of carbon dioxide emissions for all Kyoto Protocol Parties with targets and timetables (except the United States and Australia). Under this simulation, countries with the tax reduced their emissions by about 20 percent, but emissions in the rest of the world increased by about 20 percent. However, when the tax was transformed into a border tax adjustment, global emissions decreased. Damien Demailly & Philippe Quirion, *Leakage from Climate Policies and Border Tax Adjustment: Lessons from a Geographic Model of the Cement Industry*, *available at* http://ideas.repec.org/p/hal/wpaper/halshs-00009337.html. (Leakage rates for the proposed U.S. legislation reported in Section III above are lower due to the more limited application of that legislation compared with the simulation noted by Demailly & Quirion).

Assume you are a legislator in Spain, looking for strategies to meet your country's commitment to reduce greenhouse gas emissions. Based on this information and the information concerning the GATT-consistency of the various taxes, which taxes, if any, would you propose?

4. *Taxes on Products Made with Fossil Fuels.* One considerable challenge for implementing a tax on carbon used to make final products is ascertaining the amount of carbon actually consumed to produce that product. Because carbon is not a component of the final product, it cannot be measured. How, then, can regulators ascertain the carbon used to produce a product? Several options are available. First, producers could be required to submit reports that demonstrate production levels and the amount and type of fuel purchased. From this data, officials could determine how much fuel was used per unit of product. As the IPCC has stated, however, "[d]etermining the emissions associated with the manufacture of a particular product, hence the border tax adjustment, is likely to be very complex because of differences in the fuel mix and production techniques used in different regions." IPCC, TECHNOLOGIES, POLICIES AND MEASURES FOR MITIGATING CLIMATE CHANGE, § 9.3 (R. Watson et al. eds., 1996). Joost Pauwelyn describes some other options based on the possibility of the United States imposing a carbon tax:

> An alternative basis for calculation of the carbon tax (or amount of emission credits to be provided) could then be the amount of carbon that would have been emitted had the imported product been produced in the United States using the U.S. *predominant method of production*. * * *
>
> An alternative method of calculation that has been suggested, largely to avoid any semblance of discrimination, is to calculate a carbon tax or emission allowance requirement on imports based on the carbon emitted using the *best available technology*. This would mean that, for example, Chinese steel made with coal would only have to pay the price of carbon emitted for the same steel produced in the United States with the least polluting technology, say, natural gas. This would, of course, seriously reduce the amount of adjustment that can be imposed on imports and may not be sufficient to address competitiveness concerns. Yet, it would avoid claims of discrimination as all "like" products —

for example, all steel — would then be taxed the same.

Joost Pauwelyn, *U.S. Federal Climate Policy and Competitiveness Concerns: The Limits and Options of International Trade Law* 31–32 (Nicholas Institute for Environmental Policy Solutions, 2007) (emphasis in original). Under any of these scenarios, "the process of calculating [border tax adjustments] will be expensive and time-consuming." Richard G. Tarasofsky, *Heating Up International Trade Law: Challenges and Opportunities Posed by Efforts to Combat Climate Change*, 1 CLIMATE CHANGE L. REV. 7, 12 (2008). Despite the cost, is such a border tax adjustment worthwhile? Are there other options that may be easier and less costly to implement?

5. "***Like Products.***" Many benefits could derive from taxing or regulating products with a high climate change impact more rigorously than products with a lower climate change impact. Vehicles with poor fuel economy could be taxed higher than vehicles with better fuel economy. Vehicles with flex fuel engines — those that can use any blend of gasoline and ethanol — could be taxed differently from cars with conventional engines. Electricity from renewable sources could be preferred to electricity from other sources. The GATT may also allow a differential tax based on the type of engine (flex-fuel, hybrid, electric, conventional) because such taxes would seem to be related to the physical characteristics of the car. Still other distinctions, such as those between coal-based electricity and hydropower, are clearly inconsistent with GATT rules (provided electricity is a good). Implementing such taxes, however, entails risks because they could be challenged in a WTO dispute. To alleviate this risk, WTO members could adopt a formal interpretation that identifies certain products as "not like products." Do you think it should? If so, what other categories of "not like products" would be valuable from a climate change perspective?

D. Renewable Energy Requirements

To reduce CO_2 emissions, countries have adopted a number of different kinds of renewable energy requirements. The European Union and numerous states in the United States require a certain percentage of energy sold or consumed in the state to come from renewable sources. For example, Maine requires certain electricity providers to derive at least 30 percent of their supply sources for retail electricity from "renewable" or "efficient resources." ME. REV. STAT. ANN. tit. 35-A, § 3210(3) (West 2003). Maine defines renewable energy sources to include small hydropower facilities (which are abundant in the state) but not hydroelectric facilities with a production capacity over 100 megawatts (which are prevalent in the Canadian provinces that border Maine). Similarly, under Maryland's renewable energy portfolio standards, eligible hydroelectric facilities must generate 30 megawatts of power or less. Code of Maryland, § 7-701 *et seq.*

Because electricity is commonly bought and sold in international markets, renewable energy requirements pose a number of trade issues. First, while these and other state laws are facially nondiscriminatory — they do not, for example, impose higher taxes on Canadian electricity — they may disadvantage producers from other countries and be considered discriminatory within the meaning of the GATT. In the past, trade panels have found *de facto* discrimination where a

facially neutral measure changes the conditions of competition between imported and domestic products. *See, e.g.*, *Korea-Measures Affecting Import of Fresh, Chilled & Frozen Beef*, Appellate Body Report, WT/DS161/AB/R, WT/DS169/AB/R, para. 137 (Jan. 11, 2001) (stating that "a formal difference in treatment" between imported and like domestic products is not necessary to show a violation of Article III:4). The requirements of Maine and Maryland, for example, could disadvantage Canadian producers of energy, because Canada's comparative advantage in electricity generation derives from "big" hydro. In 1998 and 1999, Canada generated about 96 percent of its hydroelectric power from facilities that produce more than 30 megawatts. Because hydroelectric facilities account for about 60 to 65 percent of Canadian electricity exports to the United States, renewable energy requirements could adversely affect demand for Canadian electricity. Canadian Electricity Association, *Electric Power in Canada 1998–1999* (2000).

Second, renewable energy requirements may violate the GATT's bar against taxing or regulating products differently based on the way they are produced. As described above, GATT and WTO panels have consistently rejected claims that governments could distinguish products based on processes and production methods. Instead, distinctions in tax or regulatory treatment must be based on some characteristic of the product. Thus, laws that tax or regulate electricity differently based on the way they are produced (e.g., coal, large-scale hydroelectric facilities, or small-scale hydroelectric facilities) would violate the prohibition against restrictions on the importation of products found in GATT Article XI. Renewable energy requirements that merely require electricity providers to use energy from renewable sources may not violate Article XI. On the other hand, they may still violate Article III by creating *de facto* discrimination between foreign and domestic sources. For example, the laws of U.S. states that define renewable hydropower as deriving from facilities of less than 30 megawatts clearly discourage imports from Canada. Previous decisions of trade panels have held that such de facto discrimination affects the internal sale of products in violation of Article III's national treatment obligation. *Canada-Administration of the Foreign Investment Review Act*, GATT Panel Report, L/5504, BISD, para. 6.1 (1984) (adopted Feb. 7, 1984).

QUESTIONS AND DISCUSSION

1. The Canadian province of Ontario has instituted a Feed-in Tariff Program (FIT Program) through which it provides guaranteed, long-term pricing for the output from renewable energy generation facilities that contain a defined percentage of domestic content. For example, a solar photovoltaic project will benefit from guaranteed electricity prices if 60 percent of the project materials are manufactured or produced in Ontario. Ontario Power Authority, *Micro Feed-in Tariff Program: Program Overview*, 12 (2010); *see also* Ontario Green Energy and Green Economy Act, 2004, schedule B, part II 7. A WTO panel agreed with Japan and the European Union that these requirements violated Canada's national treatment obligation under GATT Article III because the measures accord less favorable treatment to imported equipment for renewable energy generation facilities than accorded to like products originating in Ontario. It also agreed that the program violates the same national treatment obligation under the WTO Agreement on Trade-related Investment Matters. *Canada-Certain Measures Affecting the Energy*

Generation Sector/Canada-Measures Relating to the Feed-in Tariff Program, Panel Report, WT/DS412/5, WT/DS426/5 (Dec. 19, 2012).

The panel concluded, however, that the program did not constitute a prohibited subsidy under the WTO's Agreement on Subsidies and Countervailing Duties. Under the WTO Agreement on Subsidies and Countervailing Measures, a subsidy is defined as a "financial contribution" that "confers a benefit." The benefit is based on whether the financial contribution puts the recipient in a better position than a competitive market would. On this point, the panel concluded that the electricity market is highly regulated and that Japan and the EU failed to show that a benefit had been conferred. In essence, all electricity generators were getting different types of benefits, whether in the form of price supports, guaranteed contracts, or other means. The panel also discussed at length how the volatility of the electricity market almost compels a government to step in and provide incentives for investment. The Panel concluded:

> The outcome [of the approach to subsidies suggested by the EU and Japan] would fail to reflect the reality of modern electricity systems, which by their very nature need to draw electricity from a range of diverse generation technologies that play different roles and have different costs of production and environmental impacts.

Id. at para. 7.315. Canada has vowed to appeal the decision. For more information on the WTO consistency of feed-in tariff programs, see Marie Wilke, *Feed-in Tariffs for Renewable Energy and WTO Subsidy Rules: An Initial Legal Review* (International Centre for Trade and Sustainable Development, 2011).

2. A similar dispute arose under European Community law. Under Germany's Electricity Law, electricity distributors were required to buy electricity generated by producers of renewable energy at a fixed minimum price. Any additional costs paid by electricity distributors for higher priced renewable energy may be passed on to electricity producers if the electricity purchased exceeds 5 percent of the electricity supplied to end users. The European Court of Justice ruled that these provisions did not constitute an impermissible subsidy under the Treaty Establishing the European Community. Case ECJ C-379/98, PreussenElektra AG v. Schleswag AG (Mar. 13, 2001). For a review of this case, see Dominik Thieme & Beate Rudolf, *PreussenElektra AG v. Schleswag AG. Case C-379/98*, 96 AM. J. INT'L. L. 225 (2002).

E. Fuel Efficiency Standards and Ecolabels

WTO members cannot avoid GATT scrutiny by turning taxes into laws and regulations, because laws and regulations are also subject to the most favored nation and national treatment obligations of the GATT. In addition, technical regulations — mandatory governmental product specifications such as fuel efficiency requirements, technology standards, and emissions standards — fall within the scope of the Agreement on Technical Barriers to Trade (TBT Agreement).

Like the GATT, the TBT Agreement requires WTO members to adopt and implement technical regulations consistent with their MFN and national treatment obligations. In addition, technical regulations must not be "more trade restrictive than necessary to fulfill a legitimate objective." Although the protection of the environment is listed as a legitimate objective, members must nevertheless base their technical regulations on international standards, if they exist, unless such standards are "ineffective or inappropriate." A technical regulation based on an international standard is presumed to be consistent with the TBT Agreement. The development of technical regulations is also subject to transparency, notification, and consultation requirements.

In *EC-Sardines*, the Appellate Body set out three criteria for defining a "technical regulation": (1) the regulation applies to an identifiable product or group of products, even if not expressly identified; (2) the regulation lays down one or more characteristics of the product; and (3) compliance with the product characteristics is mandatory. Based on these criteria, the Appellate Body found that a regulation that restricted the use of the term "sardine" to a particular fish species constituted a "technical regulation." *European Communities-Trade Description of Sardines*, Appellate Body Report, WT/DS231/AB/R, paras. 176–195 (adopted Oct. 23, 2002).

This Appellate Body interpretation of the term "technical regulation" is likely to capture a broad range of measures relating to climate change. For example, regulations requiring appliances to meet certain energy efficiency requirements would certainly constitute a technical regulation — a group of products is identified (appliances) and certain characteristics of the product are mandated (energy efficiency specifications). Even an outright ban on the sale of certain products, for example cars not meeting certain fuel economy standards, would be considered a technical regulation.

Recently, WTO panels and the Appellate Body have begun to interpret the TBT Agreement's substantive obligations. Concerning the most favored nation and national treatment obligations, the Appellate Body has stated that not all regulatory distinctions between products found to be like are prohibited. When a technical regulation discriminates against imported products, a panel must determine whether the detrimental impacts stem exclusively from a legitimate regulatory distinction or discrimination against the group of imported products. For example, the United States tried to justify a prohibition against flavors, including cloves, in cigarettes while exempting menthol cigarettes from the ban by claiming that millions of menthol cigarette smokers would be affected by withdrawal symptoms. The Appellate Body did not agree that this constituted a legitimate regulatory distinction because menthol cigarette smokers could simply switch to regular cigarettes, which remain legal to sell. *United States-Measures Affecting the Production and Sale of Clove Cigarettes*, Appellate Body Report, WT/DS406/AB/R, paras. 193, 215, 225 (published Apr. 4, 2012) (adopted Apr. 24, 2012).

With the jurisprudence concerning the substantive obligations of the TBT Agreement still in its infancy, it is difficult to analyze technical regulations concerning climate change. The following examples highlight some of the issues:

Fuel Economy and Appliance Efficiency Standards. The transportation sector accounted for

23 percent of global CO_2 emissions in 2005. CO_2 emissions from transport have grown by 45 percent from 1990 to 2007, primarily from road transport, they are expected to grow by approximately 40 percent from 2007 to 2030. INTERNATIONAL TRANSPORT FORUM, REDUCING TRANSPORT GREENHOUSE GAS EMISSIONS: TRENDS AND DATA 5 (2010).

To limit the growth of and perhaps to reduce CO_2 emissions from the transport section, countries around the world have adopted fuel economy standards. In the United States, Congress has set fuel economy standards for passenger cars at 27.5 miles per gallon (mpg), although those standards are set to rise to 46.6 mpg by 2021 and 56 mpg by 2025; separate standards exist and are planned for trucks. 76 Fed. Reg. 74854, 78869 (Dec. 1, 2011). China's standards are about 35 mpg while Japan currently tops the rankings at more than 40 mpg. From an international trade perspective, why do these differences in fuel economy matter? Which substantive rules of the TBT Agreement might allow a WTO member to challenge the fuel economy standards of say, Japan, as being too strict? Consider the following discussion concerning Japan's most recent improvements to its fuel economy standards:

> In 1998, Japan announced that it would be promulgating binding regulations for energy efficiency of nine classes of automobiles grouped by weight of the vehicle. The target in the year 2010 for each class was pegged at the "top runner," which happened to be a Japanese vehicle. Manufacturers selling vehicles in a weight class that cumulatively perform less well on average than the top runner are to be assessed a penalty. Several governments complained about this regulation, and called it a violation of the TBT Agreement. The dispute was never brought to the WTO, however, and Japan has expressed confidence that its regulation conforms to TBT.
>
> One lesson from this episode is that any national regulation having a disparate trade effect on foreign producers will raise concerns under TBT. The underlying problem is that the regulator may center attention on one attribute that may be relatively less important in other countries. In this episode, Japan was most concerned about fuel economy, but imported vehicles that are heavier may reflect competing concerns in the country of manufacture about pollution or safety.

Steve Charnovitz, *Trade and Climate: Potential Conflicts and Synergies, in* PEW CENTER ON GLOBAL CLIMATE CHANGE, BEYOND KYOTO: ADVANCING THE INTERNATIONAL EFFORT AGAINST CLIMATE CHANGE 141, 149 (2003).

Ecolabeling. Ecolabeling has become an important means for consumers to distinguish products based on their environmental characteristics without actually barring the importation of environmentally "unfriendly" products. Worldwide, thousands of products carry ecolabels, including shade-grown coffee, sustainably harvested timber products, and energy efficient appliances. For a list of ecolabels, see http://ecolabelling.org/ecolabel. Some labels simply provide information about a certain characteristic of the product, such as a car's fuel efficiency and CO_2 emissions.

Other labels provide information about the way the product was made, such as salmon-safe wine or dolphin-safe tuna. Labels could indicate whether a product was "climate-friendly" based on the amount of carbon dioxide emitted during the production process or on the energy inputs used (e.g., renewable resources versus coal). Although WTO members had disputed whether labels based on processes and production methods (PPMs) unrelated to a product, such as harvesting techniques or greenhouse gas emissions, fell within the definition "technical regulation," a recent WTO Appellate Body decision appears to have put that issue to rest. In this dispute, the Appellate Body concluded that the U.S. "dolphin-safe" label, which may be used to market tuna caught using specified dolphin-safe fishing techniques, clearly a PPM-based criterion, constituted a technical regulation. Neither the panel nor the Appellate Body explained why a PPM-based label fell within the definition of "technical regulation." Significantly, the Appellate Body also concluded that the labeling scheme was mandatory; even though producers were not required to obtain the label, U.S. law established "a single and legally mandated definition of a 'dolphin-safe' tuna product and disallows the use of other labels on tuna products that do not satisfy this definition." *United States-Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products*, Panel Report, WT/DS381/AB/R, para. 199 (published Sept. 15, 2011) (adopted June 13, 2012).

The Appellate Body further concluded that the "dolphin-safe" label discriminated against Mexican fishermen by providing less favorable treatment to them. The United States applies different standards for the dolphin-safe label such that Mexican fishermen catching tuna in the Eastern Tropical Pacific must meet different conditions for marketing tuna as "dolphin safe" from fishermen catching tuna in, for example, the Western and Central Pacific Ocean. The Appellate Body found the label discriminatory because these labeling distinctions changed the conditions of competition in the U.S. market between tuna caught by Mexican fishermen on the one hand and U.S. and other foreign fishermen on the other hand. Moreover, the United States could not justify this less favorable treatment on legitimate regulatory distinctions.

QUESTIONS AND DISCUSSION

1. Review the Appellate Body's definition of a technical regulation. Do you see why, based on the Appellate Body's interpretation of "technical regulation," that a labeling requirement to display information, such as a car's fuel economy, falls within the scope of the TBT Agreement? Do you think that a label displaying an automobile's fuel economy meets the TBT Agreement's substantive requirements?

2. Aside from the legal debate, critics of labels claim that they are discriminatory. For example, developing countries hotly contested an Austrian requirement to label all tropical timber as "Made from Tropical Timber" or "Containing Tropical Timber." They claimed the label was discriminatory because only tropical timber was subject to the label. Do you agree? Does the Austrian label, merely by identifying products as containing tropical timber, violate the most favored nation or national treatment obligation of the TBT Agreement? For more information on ecolabels and the TBT Agreement, see WOLD, GAINES, & BLOCK, *supra*, at 381–407.

3. Under the U.S. "Energy Star" program, dishwashers may be labeled with the Energy Star if they are at least 25 percent more efficient than minimum federal government standards. DVD players receive the Energy Star if they consume three watts or less when switched off. What information, if any, might you need to answer whether either of these labels is consistent with the TBT Agreement?

4. In light of the *Tuna/Dolphin* ecolabeling decision, design a climate change ecolabel that is not discriminatory. What criteria will you use to issue your label? For example, will you consider only a product's energy efficiency, like the Energy Star program? Will you provide the label for products that have fewer climate change impacts than other products (e.g., wind mills receive a label; lignite does not).

5. Ecolabels provide information to consumers while also allowing products to be sold. In this way, they "strike[] a useful balance between trade and environmental goals in many situations where the appropriateness of more severe restrictions is uncertain." ESTY, at 134. Nonetheless, ecolabels alone may be insufficient to alter market forces. For example, would the "dolphin-safe" label indicating zero dolphin mortality in a tuna fishery adequately protect dolphins without an import ban on tuna caught using dolphin unsafe fishing methods? Do you think requirements to label a vehicle's fuel economy are sufficient to reduce emissions from vehicles or are other mandatory requirements needed, such as a ban on the import and sale of vehicles with low fuel economy standards required?

F. Subsidies

Subsidies have generated growing interest among governments and environmental organizations that see subsidies as a means either to protect or harm the environment, depending on how they are used. For example, countries spend at least $100 billion annually on subsidies to produce fossil fuels. The elimination of these subsidies could reduce CO_2 emissions by 5 percent to 18 percent. *See* Chris Wold et al., *Leveraging Climate Change Benefits through the World Trade Organization: Are Fossil Fuel Subsidies Actionable?*, 43 GEO. J. INT'L. L. 635, 637 (2012). At the same time, subsidies can encourage the use and production of climate-friendly technologies and the use of climate-friendly practices, such as farming techniques that store carbon in the soil.

The WTO's Agreement on Subsidies and Countervailing Measures (SCM Agreement) does not judge subsidies based on their policy objective. Rather, it prohibits subsidies that distort trade by causing material injury or serious prejudice to industries in other countries (for example, by suppressing prices or displacing imports of nonsubsidized products). Subsidies that promote climate change mitigation, such as subsidies for solar panels, may result in trade distortions just like any other subsidy by providing an unfair advantage for the country's solar panels in the marketplace. In fact, some U.S. producers of solar panels challenged imports of subsidized solar panels from China, claiming that those subsidies cause material injury to the U.S. industry. Where a subsidy distorts trade by material injury or serious prejudice to another country's

industry, the harmed country may retaliate with countervailing duties — increased duties to offset the harm caused by the subsidy. In the case brought by U.S. solar panel manufacturers, the U.S. Department of Commerce imposed duties ranging from 2.9 to 4.73 percent on Chinese-made solar panels and cells after finding the Chinese government was improperly subsidizing manufacturers. Crystalline Silicon Photovoltaic Cells, Whether or Not Assembled Into Modules, From the People's Republic of China: Preliminary Affirmative Countervailing Duty Determination, 77 Fed. Reg. 17349 (Dep't of Commerce, Mar. 26, 2012) (notice). In a related action, the Department of Commerce preliminarily imposed dumping duties on imports of Chinese of solar cells from certain manufacturers from 31.14 percent to 249.96 percent. 77 Fed. Reg. 31309 (May 25, 2012). China has subsequently concluded that the renewable energy subsidy programs of five U.S. states violate the SCM Agreement as prohibited subsidies and the national treatment obligation of GATT Article III and that it would seek adjudication of the dispute at the WTO. Ministry of Commerce of the People's Republic of China, Announcement No. 26, 2011, "Conclusion on the U.S. Policy Support and Subsidies for Its Renewable Energy Sector," May 24, 2012.

To fall within the scope of the SCM Agreement, the government must provide a financial contribution, such as the transfer of funds or the provision of goods or services, that confers a benefit to the recipient. The subsidy must also be "specific" to a limited group of enterprises. For example, a subsidy limited to producers of renewable energy or certain types of climate change mitigation technologies might be deemed a specific subsidy, because it is available in fact or in law only to certain enterprises or industries. The WTO Panel's decision in *United States-Cotton* suggests that even a relatively large number of recipients may lead to a "specificity" finding. In that case, the Panel concluded that crop insurance subsidies available for about 100 different crops were available to "a sufficiently discrete segment of the United States economy to qualify as 'specific.'" *United States-Subsidies on Upland Cotton*, Panel Report, WT/DS267/R, para. 7.1150 (Sept. 8, 2004), affirmed by the Appellate Body Report, *United States-Subsidies on Upland Cotton*, WT/DS267/AB/R, para. 543 (published Mar. 3, 2005). Where subsidies distort trade and are considered specific, they are subject to retaliatory trade sanctions.

While the SCM Agreement casts doubt on some efforts to mitigate climate change, it also prohibits actions of WTO members that may hinder climate change mitigation. For example, the U.S. corn economy is supported by vast subsidies: corn and soybean producers collectively receive about 80 percent of total subsidy payments of $8 to $14 billion annually. VINCENT H. SMITH ET AL., FIELD OF SCHEMES: THE TAXPAYER AND ECONOMIC WELFARE COSTS OF SHALLOW-LOSS FARMING PROGRAMS 1, 26 (May 30, 2012). WTO panels have concluded that U.S. cotton subsidies and EU sugar subsidies are inconsistent with the SCM Agreement, and it is highly likely that they would draw the same conclusions with respect to U.S. corn subsidies (Canada and Brazil have lodged a WTO dispute). That U.S. corn subsidies distort the world market for corn is plain. For example, Mexican farmers are actually reducing their corn prices below costs of production to compete with U.S. corn. Timothy A. Wise, *The Paradox of Agricultural Subsidies: Measurement Issues, Agricultural Dumping and Policy Reform* (Global Dev. and Env't Inst. Working Paper No. 04-02, *available at* http://ase.tufts.edu/gdae/Pubs/wp/04-02AgSubsidies.pdf. Because sugarcane-based ethanol has an energy balance — the ratio of energy contained in the final biofuel product to the energy used to produce it — about 5.33 times

higher than corn-based ethanol, the SCM Agreement could be an effective means for eliminating subsidies for "underperforming" corn-based ethanol.

QUESTIONS AND DISCUSSION

1. To avoid a specificity finding, WTO members must provide a subsidy based on objective criteria or conditions that apply to any potential recipient (i.e., the criteria or conditions do not target certain industries or enterprises). Moreover, the subsidy must be granted automatically upon fulfillment of the criteria or conditions; any agency discretion to refuse the subsidy could lead to a "specificity" finding by a trade panel. Consider the following three subsidies: Country X provides a subsidy to any facility that 1) achieves a certain level of carbon dioxide emissions during the production process, 2) reduces carbon dioxide emissions by a certain percentage, or 3) produces products that meet certain energy-efficiency criteria. Would any of these be sufficiently "specific" to be covered by the SCM Agreement? *See* Yulia Selivanova, *Transition to a Sustainable Energy Future: Global Trade Rules and Energy Policies, in* LINKING TRADE, CLIMATE CHANGE AND ENERGY 3, 4 (International Centre for Trade and Sustainable Development 2006).

2. WTO members could advance the climate change mitigation agenda by ensuring that a range of climate-friendly subsidies are not actionable under the SCM Agreement. They have adopted just this approach for fisheries subsidies. Although the negotiations are not yet finished, the members have found common ground on a range of permissible and prohibited fisheries subsidies. For example, subsidies for artisanal fishing and for the construction of water and sanitary waste systems serving fish processing facilities, among many others, have been proposed as permissible under the SCM Agreement. *See, e.g.*, New Zealand, *Fisheries Subsidies: Exhaustive List of Non-Prohibited Fisheries Subsidies*, TN/RL/GEN/141 (June 6, 2006). If this approach were adopted for climate change, what would you include in your lists of permissible and prohibited subsidies?

3. The significance of subsidies to the renewable energy sector is difficult to gauge, but given the implicit subsidies for coal and other fossil fuels, the price of renewable energy is still high. One recent indication of the importance of subsidies may come from the United Kingdom. When the government halved the subsidy available for solar panels, solar panel installations fell by almost 90 percent. Damian Carrington, *Solar Panel Demand Down Nearly 90% Following Subsidy Cut*, THE GUARDIAN, May 1, 2012, http://www.guardian.co.uk/environment/2012/may/01/solar-panel-demand-subsidy-cut. In addition, the Coalition for Affordable Solar Energy, a group of more than 100 U.S. producers of solar panels, opposes the imposition of duties against Chinese solar panels, fearing that they will increase costs and reduce demand for solar power. Deborah Solomon, *Obama to China: We Need Your Solar Panels, But They're Too Cheap*, BLOOMBERG (Mar. 22, 2012).

4. *Trade Sanctions for Nonparticipation.* A number of climate change proposals have attempted to prevent free-riders — principally the United States — from receiving benefits of other country's climate change mitigation efforts without accepting any of the costs. For

example, French Prime Minister de Villepin has proposed a tax, or anti-dumping duty, against those who "dump" their products — that is, sell their products below the cost of production — on the international market because they refuse to include the social cost of carbon dioxide emissions in the price of their goods. Under the WTO's Anti-Dumping Agreement, however, goods are dumped only when the price of the good falls below the price of the good in the market of the country allegedly engaged in dumping. Thus, as long as the exporting country does not tax or regulate carbon dioxide emissions, the failure to internalize the social cost of carbon dioxide emissions in exported goods cannot be considered dumping. Anti-Dumping Agreement, art. 2.1; *see* Pauwelyn, at 13–14. Others, such as Joseph Stiglitz, have called for a countervailing duty on products not subject to a carbon tax based on the idea that such products are "subsidized." Joseph E. Stiglitz, *A New Agenda for Global Warming*, ECONOMISTS' VOICE 3 (July 2006). The SCM Agreement clearly answers that such products are not subsidized because the government has not provided any financial contribution, i.e., there is no transfer of funds or provision of goods or services. Even if the failure to tax or regulate carbon dioxide emissions was somehow construed as a subsidy, it would not be "specific," because the subsidy would be generally available to everyone. For more on whether the failure to regulate constitutes a subsidy, see WOLD, GAINES, & BLOCK, at 573–80.

5. Prior to January 1, 2012, the United States discouraged imports of ethanol by imposing a tariff of 54 cents per gallon on imported ethanol. It also provided a production tax credit of 46 cents per gallon to U.S. producers. Because ethanol produced from sugarcane in Brazil costs 40 percent to 50 percent less to produce than U.S.-produced ethanol and because U.S. wholesale ethanol prices ranged from $1.80 to $2.06 per gallon at the beginning of 2006, the tariff created a "significant barrier to imports." Brent D. Yacobucci, *Ethanol Imports and the Caribbean Basin Initiative* 3 (CRS Report for Congress, Updated March 10, 2006). When Congress refused to extend the tariff and production credit in 2012, it finally opened the United States to the much more efficient sugarcane-based ethanol. The energy produced by ethanol compared to the energy invested in its production is about nine to one in Brazil for sugarcane-based ethanol, but just 1.3 to one for corn-based ethanol produced in the United States and two to one for sugarbeet ethanol in Europe. John Mathews, *The End of the U.S. Ethanol Tariff*, THE GLOBALIST (The Globalist Research Center, Jan. 6, 2012).

6. ***Carbon Trading and the GATS.*** Even the carbon trading provisions of the Kyoto Protocol raise trade questions. Many activities related to joint implementation (JI) and the Clean Development Mechanism (CDM) are services covered by the General Agreement on Trade in Services (GATS). Some entity, whether private or governmental, must issue emission reduction units (ERUs) and certified emission reductions (CERs). The design of a JI or CDM project will require engineering, architectural and planning services, as well as construction, installation, assembly, finishing and, in some cases, landscaping and real estate services. To monitor and maintain the project, additional services may be required, such as accounting, testing and analysis, and consulting services. Securing project funding and executing contracts will necessitate financial, lending, and legal services. If a secondary market exists for ERUs and CERs, brokerage, advisory and ratings services may be needed to buy, sell, or trade them. The extent to which these services are covered, or perhaps of more concern, not covered by the GATS, may determine how effectively and efficiently these services can be provided.

While the GATS includes most favored nation and national treatment obligations, it also includes an array of exceptions. While a few members, including the United States, have undertaken commitments to apply the most favored nation and national treatment obligations to certain energy-related services, the vast majority of members have not. As a consequence, the energy sector in many countries is characterized by discriminatory barriers to trade in services. *See generally*, Office of the United States Trade Representative, *Report of the Office of the United States Trade Representative on Trade-Related Barriers to the Export of Greenhouse Gas Intensity Reducing Technologies* 2 (Oct. 2, 2006). Because many developing countries often view national control over natural resources generally and energy resources in particular as critical to their identity, sovereignty, and development, they are unlikely to liberalize trade in energy services without substantial concessions from developed countries.

7. *Class Exercise*. Consider the following situations. What are the possible WTO-related claims that you would bring against these measures? What do you think the likely outcome would be in a WTO dispute?

- As a means to encourage energy efficiency, Country A imposes an import duty of 10 percent *ad valorem* on incandescent light bulbs. An equivalent tax is imposed on domestically-produced incandescent light bulbs. Compact fluorescent light bulbs, whether imported or domestically produced, have no duty or tax imposed on them. Are these tax distinctions consistent with the GATT?

- Country B bans the importation of ethanol produced from corn for two reasons. First, ethanol produced from sugarcane produces more energy than ethanol produced from corn. Second, Country B believes that corn should be used to produce food, and blames corn-based ethanol for increases in corn products. Is this ban consistent with the GATT?

- To discourage the use of fossil fuels for the production of electricity, Country C has adopted incentives for the use of renewable energy. One incentive provides a bonus for the production of electricity from certain renewable sources. As just two examples, electricity from wind turbines receives a bonus of $1.25 per watt produced and biogas receives $2.00 per watt produced. A second incentive provides an additional 20 percent bonus for renewable energy produced in Country C. These incentives have created 20,000 jobs and a total capacity of 252 megawatts. Are these incentives consistent with the GATT or the SCM Agreement?