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ABSTRACT

Reducing emissions of greenhouse gases will require the developing carbon management technologies that are not currently available or that are not currently cost-effective. While market mechanisms, such as carbon pricing, must play a central role in stimulating the development of these technologies, governmental policy aimed at fostering carbon management technologies and lowering their costs must also play a part. Both types of policies will form part of an optimal greenhouse gas control portfolio. This article develops a framework of international trade and investment law insofar as they may affect carbon management technologies. While it is commonly perceived that international trade law and investment law usually constrain the development of environmental policy, the flipside is often ignored. In addition to discussing how carbon management policy might be constrained, this article also identifies opportunities within the framework of international trade and investment law in which carbon management technologies might be advanced or supported.

I. INTRODUCTION

Reducing emissions of greenhouse gases (GHG) will require the development of emissions abatement technologies that are not currently available or that are not currently cost-effective. While market mechanisms, such as carbon pricing, must play a central role in stimulating the development of these technologies, governmental policy aimed at fostering these technologies and lowering their costs must also play a part.

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Economic analysis suggests that both types of policies will form part of an optimal greenhouse gas control portfolio.¹

Of the many GHG-reducing technologies currently being discussed, this article will focus on carbon capture and storage (CCS) technology as the most salient and most representative GHG emissions abatement technology. CCS technology remains an immature technology; but like many other GHG emissions reductions technologies, holds great potential for reducing emissions while minimizing disruption to existing energy systems. More generally, this article will entertain the possibility that other technologies may emerge to play a prominent role in carbon management, and will refer to these technologies as carbon management technologies (CMTs). CMTs contemplated in this article (most prominently CCS) build on an existing infrastructure associated with upstream energy production, and hence do not require drastic changes in infrastructure or behavior. Government support for CMTs has been provided on a relatively *ad hoc* basis. This article provides an analysis of the legal ramifications of policies to support CMTs, so as to afford guidance to policymakers and aid in providing a rational, coherent, consistent set of GHG policies. Towards that end, we analyze the international trade and international investment law implications of different policies to support CMTs.

This article surveys policies that support CMTs in Section II, and discusses the international investment law and international trade law implications of such policies. The discussion is broken down into two sections: Section III discusses how international investment law and international trade law may *constrain* CMT-promoting policies, and Section IV discusses how they may *aid* them. International investment law or international trade law might constrain CMT-promoting policies if, for example, carbon intensive investors or states could argue that these CMT-promoting policies adversely affect the financial viability of their investments² or violate a World Trade Organization (WTO) rule.³ On the other hand, international investment law and international trade law could promote or reinforce CMT-promoting policies.⁴ This could be the

1. See generally CAROLYN FISCHER & RICHARD NEWELL, ENVIRONMENTAL AND TECHNOLOGY POLICIES FOR CLIMATE MITIGATION (Feb. 2004), available at <http://www.rff.org/Documents/RFF-DP-04-05-REV.pdf>.

2. Anatole Boute, *The Potential Contribution of International Investment Protection Law to Combat Climate Change*, 27 J. ENERGY & NAT. RESOURCES L. 333, 335 (2009).

3. GARY CLYDE HUFBAUER ET AL., GLOBAL WARMING AND THE WORLD TRADING SYSTEM 31 (2009).

4. See, e.g., Anatole Boute, *Combating Climate Change through Investment Arbitration*, 35 FORDHAM INT'L L.J. 613 (2012); TRACEY EPFS & ANDREW GREEN, RECONCILING TRADE AND CLIMATE: HOW THE WTO CAN HELP ADDRESS CLIMATE CHANGE 3-4 (2010).

case if, for example, they shield investors in CMTs against regulatory changes that could affect the financial viability of their projects. While a common notion exists that international investment law and international trade law predominantly *constrain* environmental policy, this is not necessarily accurate. In addition to identifying the potential constraints, this article will identify ways that CMT-promoting policies could benefit from international investment law or international trade law.

II. INCENTIVES FOR CARBON MANAGEMENT TECHNOLOGIES

An encyclopedic body of literature already addresses a wide variety of issues pertaining to climate policy. Reducing the carbon footprint of developed economies and minimizing the footprint of developing economies is a policy problem with an enormous number of branches of research. In this vast literature, however, climate technology policy is discussed infrequently. This article thus consciously takes a technological perspective, focusing on policies to facilitate the development of technologies to reduce emissions in the upstream energy production sector. We do not discuss broader GHG-reduction policies such as conservation and efficiency measures.⁵ This article will only make a brief point about carbon pricing and trade law, eschewing a lengthy discussion about the many policy aspects and implications of carbon pricing that have been treated extensively elsewhere.⁶

A. Carbon Management Technologies

The CMT most relevant to this article is CCS. CCS reduces CO₂ emissions by capturing them from a point source⁷ and injecting the captured CO₂ into a suitable geological formation (depleted oil or gas reservoirs, deep saline aquifers or un-minable coal seams) from which they

5. For reviews that discuss a broader range of policy measures see, e.g., Richard Ottinger et al., *Renewable Energy in National Legislation: Challenges and Opportunities*, in *BEYOND THE CARBON ECONOMY: ENERGY LAW IN TRANSITION* 183 (Donald Zillman et al. eds., 2008); see also Catherine Banet, *The Use of Market-Based Instruments in the Transition from a Carbon-Based Economy*, in *BEYOND THE CARBON ECONOMY: ENERGY LAW IN TRANSITION* (Donald Zillman et al. eds., 2008).

6. See, e.g., SHI-LING HSU, *THE CASE FOR A CARBON TAX: GETTING PAST OUR HANG-UPS TO EFFECTIVE CLIMATE POLICY* 15–17, 20–22, 191–94 (2011).

7. See also Klaus S Lackner, *Comparative Impacts of Fossil Fuels and Alternate Energy Sources*, in *CARBON CAPTURE: SEQUESTRATION AND STORAGE* 1, 28–31 (R.E. Hester & R.M. Harrison eds., 2010) (discussing the fact that direct air capture technology is also being explored and should it become feasible on a large scale, it would not be restricted to point sources but could also provide a mechanism to correct for past emissions and for generalized sources such as the transportation industry).

will not enter the atmosphere and contribute to climate change.⁸ While much of the CCS discussion has centered upon the electricity generation industry, CCS also offers promise for other industrial applications⁹ such as the upstream energy production sector that is the focus of this article.

Research is underway to improve the technology involved in each of the three links in the CCS chain: capture, transport and storage. A few full-scale commercial projects already successfully store CO₂ streams captured from natural gas production in deep saline formations.¹⁰ Others involve the combination of carbon capture and enhanced oil recovery (EOR) processes in order to add a financial incentive for upstream capture.¹¹ EOR involves CO₂ injection into a depleting field in order to maximize oil production by reducing oil viscosity and improving geological porosity.¹² Since permanent CO₂ storage is not the primary goal in EOR undertakings, they often lack monitoring regimes, but they do provide important insights into techniques for future technological development.¹³ Some upstream natural gas extraction and hydrogen production processes result in relatively pure streams of CO₂. This reduces capture costs and makes these processes well-placed to take advantage of CCS technology with significant cost savings.¹⁴ Technologically, CCS in the upstream energy industry is feasible, and future improvements await the

8. See, e.g., Nick Riley, *Geological Storage of Carbon Dioxide*, in CARBON CAPTURE: SEQUESTRATION AND STORAGE, *supra* note 7 at 155, 156, 170 (discussing saline aquifers and depleted hydrocarbon sites as having the largest potential volume and the most well known capacity respectively).

9. INT'L ENERGY AGENCY & UNITED NATIONS INDUS. DEV. ORG., TECHNOLOGY ROADMAP: CARBON CAPTURE AND STORAGE IN INDUSTRIAL APPLICATIONS 6 (2011), available at http://www.unido.org/fileadmin/user_media/News/2011/CCS_Industry_Roadmap_WEB.pdf [hereinafter CCS INDUSTRY ROADMAP].

10. See, e.g., K Michael et al., *Geological storage of CO₂ in saline aquifers—A review of the experience from existing storage operations*, 4 INT'L J. GREENHOUSE GAS CONTROL 659, 660 (2010) (discussing projects undertaken in Salah, Algeria (2004); Sleipner, Norway (1996); and Snhvit, Norway (2008)).

11. See, e.g., GLOBAL CCS INSTITUTE, THE GLOBAL STATUS OF CCS: 2011, at 11 (2011), available at <http://cdn.globalccsinstitute.com/sites/default/files/publications/22562/global-status-ccs-2011.pdf> [hereinafter GLOBAL CCS INSTITUTE] (projects include: Val Verde Natural Gas Plant (1972), Shute Creek Gas Processing Facility (1986), Century Plant (2010), and Great Plains Synfuels Plant and Weyburn-Midale Project (2000) in the U.S and Canada).

12. See, e.g., Riley, *supra* note 8, at 165–68 (CO₂ can also be injected into depleted gas fields (enhanced gas recovery) or into coal or shale beds post-hydrofracing in order to displace additional methane (enhanced coal bed methane recovery and shale gas technology). These technologies offer promising hydrocarbon recovery applications but require additional research before they will significantly contribute to permanent CO₂ storage requirements.).

13. Michael, *supra* note 10, at 664; GLOBAL CCS INSTITUTE, *supra* note 11, at 12, 17.

14. CCS INDUSTRY ROADMAP, *supra* note 9, at 20.

development of additional large-scale projects.¹⁵ For example, in Canada, where oil production has become the fastest-growing source of emissions,¹⁶ CCS projects—such as the recently approved Quest Project in Alberta, which will capture of 1.2 MtCO₂ per year,¹⁷—will be vital to the sustainability of Canada's upstream oil industry.

Barriers to implementing CCS in the upstream energy industry are not insurmountable if addressed with appropriate policy instruments. These barriers include cost,¹⁸ long project lead-times for storage site identification,¹⁹ transportation infrastructure development,²⁰ a clear legal framework²¹ and public engagement.²² These are barriers that can be addressed with informed government policy.

Other CMTs, both potential and existing, may play an important role in reducing GHGs. Policies promoting these other CMTs, such as government subsidies and technology-based regulations, may also have international trade and investment law implications. Some CMTs are already well-developed but face other barriers to implementation, and may benefit from policies similar to those promoting CCS. For example, technologies to capture or avoid the venting, fugitive emission, and flaring of natural gas²³ are already readily available. A World Bank project,

15. Michael et al., *supra* note 10, at 664–65; CCS INDUSTRY ROADMAP, *supra* note 9, at 8–9.

16. ENV'T CAN., CANADA'S EMISSIONS TRENDS 51 (2011), available at <http://www.ec.gc.ca/Publications/E197D5E7-1AE3-4A06-B4FC-CB74EAAA60F/CanadasEmissionsTrends.pdf>.

17. ENERGY RES. CONSERVATIONS BD., APPLICATION FOR THE QUEST CARBON CAPTURE AND STORAGE PROJECT: RADWAY FIELD 1–2 (2012), available at <http://www.ercb.ca/decisions/2012/2012-ABERCB-008.pdf>.

18. See CCS INDUSTRY ROADMAP, *supra* note 9, at 14. In order to drop global industry emissions by 11Gt CO₂ compared to the baseline 2050 scenario, approximately US\$250 billion is needed globally to deploy 268 projects in the high-purity sector and US\$175 billion is needed to deploy 88 projects in the refineries sector. This can be compared to the approximately US\$1250 billion required to deploy 14 projects in the iron and steel industry. These estimates include infrastructure, transportation and storage costs. CCS INDUSTRY ROADMAP, *supra* note 9, at 16–18.

19. See GLOBAL CCS INSTITUTE, *supra* note 11, at 57.

20. See *id.*, at 47.

21. CCS INDUSTRY ROADMAP, *supra* note 9, at 29.

22. GLOBAL CCS INSTITUTE, *supra* note 11, at 95.

23. Venting is the intentional release of un-combusted natural gas in to the atmosphere. BC OIL & GAS COMM'N, FLARING, INCINERATING AND VENTING REDUCTION REPORT FOR 2010 7 (2010), available at <http://www.bcogc.ca/document.aspx?documentID=1206>. Fugitive emissions refer to the unintentional emission of natural gas. *Id.* at 21. Flaring is the intentional combustion of natural gas for disposal. *Id.* at 7. Venting and fugitive emissions are direct releases of methane, which has a global warming potential that is 21 to 23 times greater than carbon dioxide. CONTRIBUTION OF WORKING GROUP I TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: THE PHYSICAL SCI-

the Global Initiative on Gas Flaring Reduction, seeks to reduce natural gas flaring around the world, particularly in developing countries.²⁴ The findings of this initiative suggest that the problems with preventing venting, fugitive emission, and flaring of natural gas are mostly institutional and regulatory, not technological.²⁵ Promoting such mature but policy-poor CMTs with appropriate incentives is thus also an important objective of this analysis.

B. Measures Promoting Carbon Management Technologies

Governments face a number of policy choices when determining the most effective way to promote technology development and diffusion. In addition to cost-effectiveness, governments are sometimes constrained by administrative capacity and political feasibility in designing policy. Five feasible and realistic policies to promote CMTs in the upstream energy industry are briefly introduced to form a framework for discussion. These policies are: (1) subsidies; (2) regulations; (3) removal of trade barriers; (4) developing infrastructure and administrative capacity; and (5) carbon pricing.

1. Subsidies

Subsidies for capital investments, research and development funding, pilot project grants, capacity building grants, tax exemptions, and free emissions allowances under a cap-and-trade scheme may promote the diffusion of target technologies. Financial support for pilot CCS projects and for capacity building research have been prominent parts of climate policy for over a decade.²⁶ Much of this funding has targeted the

ENCE BASIS 212 (S Solomon et al. eds., 2007), available at http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4_wg1_full_report.pdf (21 times greater); ENVTL. PROT. AGENCY, METHANE TO MARKETS PARTNERSHIP: QUESTIONS AND ANSWERS 1 (2010), <http://www.epa.gov/methane/pdfs/qanda.pdf> (23 times greater).

24. The World Bank, *Global Gas Flaring Reduction: A Public-Private Partnership, About GGFR*, WORLD BANK.ORG, <http://go.worldbank.org/Q7E8SP9J90> (last updated Sept. 11, 2012).

25. Reports commissioned by the Global Initiative GFR point to the importance of appropriate regulations along with monitoring and enforcement procedures. WORLD BANK GRP., REGULATION OF ASSOCIATED GAS FLARING AND VENTING: A GLOBAL OVERVIEW AND LESSONS FROM INTERNATIONAL EXPERIENCE, GGFR REPORT NUMBER 3, at 25 (2004), available at http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2004/07/16/000012009_20040716133951/Rendered/PDF/295540Regulation0no10301public1.pdf [hereinafter GGFR REPORT 3]; see also FRANZ GERNER ET AL., PUBLIC POLICY FOR THE PRIVATE SECTOR: GAS FLARING AND VENTING (2004), available at <http://rru.worldbank.org/documents/publicpolicyjournal/279gerner.pdf>.

26. See generally INT'L ENERGY AGENCY, TECHNOLOGY ROADMAP: CARBON CAPTURE AND STORAGE 11 (2009) [hereinafter IEA ROADMAP] (public support of CCS demonstration

electricity generation industry,²⁷ but governments of jurisdictions in which fossil fuel extraction is particularly important—such as Norway, the European Union, the United States, Canada, and Australia—are also prominent backers of upstream CCS projects. The Carbon Capture and Sequestration Technologies program at MIT lists on its website sixty-five CCS projects, twenty-nine of which are operational,²⁸ the vast majority of which involve some governmental funding.²⁹ GHG policy built solely on technology-promoting subsidies would be problematic. But subsidies may prove useful for early technology deployment.³⁰

2. Regulations

CMT could simply be promoted by a regulation mandating its implementation. The traditional approach to environmental law is to administratively establish performance standards for certain common classes of emitters.³¹ These standards may not mandate the use of a specific technology but instead set allowable emissions levels class-by-class, resulting in indirect technology promotion. For example, the California Low Carbon Fuel Standard sets allowable average lifecycle GHG emissions for different fuel types.³² The European Fuel Quality Directive (EFQD) sets a baseline standard based on fuel feed stocks and also offers

projects (US\$bn): United States: 3.4; EU: 1.5 (and 300m credits in Emissions Trading Scheme); Australia: 1.65; Canada: 3.0; Norway: 0.2; Japan: 0.1), available at http://www.iea.org/publications/freepublications/publication/CCS_Roadmap.pdf; see also GLOBAL CCS INSTITUTE, *supra* note 11, at 89–90 (direct financial support of CCS demonstration projects in 2010, including tax credits and grants (US\$bn): United States: 7.4; EU: 5.6; Australia: 4.1; Canada: 3.1; UK: 1.7; Norway: 1.0; Korea: 0.8; Netherlands: 0.3).

27. Global CCS Institute, *supra* note 11, at 91–92 (76% of funding allocated to large scale demonstrations goes to power projects).

28. *Non-Power Plant Carbon Dioxide Capture and Storage Projects*, CARBON CAPTURE & SEQUESTRATION TECHNOLOGIES @ MIT, http://sequestration.mit.edu/tools/projects/storage_only.html (last visited Apr. 19, 2013) (the author's count from reading the project descriptions and websites: all but five explicitly mention governmental funding or participation; of these five, two receive governmental CO₂ tax credits).

29. See, e.g., THE UNITED STATES CCS FINANCING OVERVIEW, CARBON CAPTURE & SEQUESTRATION TECHNOLOGIES, available at http://sequestration.mit.edu/tools/projects/us_ccs_background.html (last visited Apr. 23, 2013); CANADA CCS FINANCING OVERVIEW, available at http://sequestration.mit.edu/tools/projects/canada_ccs_background.html (last visited Apr. 23, 2013).

30. See CCS INDUSTRY ROADMAP, *supra* note 9, at 5.

31. See, e.g., Shi-Ling Hsu, *Fairness Versus Efficiency in Environmental Law*, 31 *ECOLOGY L.Q.* 303, 358–64 (2004).

32. Low Carbon Fuel Standard, CAL. CODE REGS. tit. 17, § 95482 (2012).

incentives for flaring reduction.³³ The EFQD sets a high GHG value on Canadian oil sands crude.

Regulatory approaches may also take the form of a specific practice requirement which mandates use of a certain technology, such as the requirement that new coal-fired power plants must be “CCS-ready.”³⁴ Broadly speaking, “CCS-ready” means that a power plant is designed to easily accommodate the storage, transport and retrofit for CCS.³⁵ The Canadian federal agency, Environment Canada, implemented a new performance standard that applies to new and existing coal-fired power plants at the end of their useful lives (45 years).³⁶ Given current technology options and costs, the standard effectively requires CCS technology.³⁷

3. Removal of Trade Barriers

Goods that produce environmental benefits such as CCS technologies, emissions scrubbers, renewable energy technologies, and recycling and remediation technologies are subject to high tariffs in many countries. For example, Brazil, India, and China have tariffs ranging from 8.5 to 14.1 percent for a selection of environmental goods.³⁸ Further, bound tariffs on environmental goods worldwide are estimated to average over 8 percent—much higher than the 3 percent average for other goods.³⁹ Reducing tariffs on environmental goods can make such goods cheaper

33. Draft Commission Directive . . . /EC of [. . .] laying down calculation methods and reporting requirements pursuant to Directive 98/70/ED of the European Parliament and of the Council relating to the quality of petrol and diesel fuels, dossier CMTD(2012)0166, document D016937/03, recitals 5, 7, 8, 13, art. 3 (Feb. 23, 2012), available at <http://ec.europa.eu/transparency/regcomitology/index.cfm?do=search.documentdetail&XOVfOQKYH67nl0gDR9EQ0pDU4MfDGJIHglKuEmrBsSBuE2177sL3dMBpRfefPrj> [hereinafter *EFQD Draft Directive*].

34. See GLOBAL CCS INSTITUTE, *supra* note 11, at 126, 128, 130, 132 (Australia, EU, Japan and Norway are examples of countries which require that future plants be CCS ready).

35. See generally *id.* at 5–11.

36. Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity Regulations, Regulatory Impact Analysis Statement, SOR/2012-167, (Can.), <http://gazette.gc.ca/rp-pr/p2/2012/2012-09-12/html/sor-dors167-eng.html>.

37. Andrew Sullivan, *Federal Government Introduces Regulations to Progressively Phase-out Coal Plants*, CAN. ENERGY L. (Sept. 12, 2010), http://www.canadianenergylaw.com/2012/09/articles/climate-change/federal-government-introduces-regulations-to-progressively-phaseout-coal-plants/?utm_source=feedburner&utm_medium=feed&utm_campaign=feed%3A+CanadianEnergyLaw+%28Canadian+Energy+Law%29.

38. INT’L CENTRE FOR TRADE AND SUSTAINABLE DEV. PROGRAMME ON GLOBAL ECON.POL’Y & INSTS. ET AL., TRADE AND ENVIRONMENT BRIEFINGS: TRADE IN ENVIRONMENTAL GOODS 3 (Policy Brief 6, June 2012), available at <http://ictsd.org/downloads/2012/06/trade-in-environmental-goods.pdf>.

39. *Id.* at 2.

in the importing country, and therefore increase demand and improve environmental outcomes.⁴⁰

4. *Developing Infrastructure and Administrative Capacity*

Successfully diffusing new technologies may require governments to adopt measures that clarify the legal rights and obligations of parties. In other cases, technology diffusion may require governments to create some form of entitlement to reduce legal risks (or at least allow parties to properly assess the nature or scale of the risk) and transaction costs. For example, enabling CCS technology may require governments to define the legal ownership of pore spaces (underground caverns in which CO₂ can be stored), establish the applicable regulatory rules for CCS processes, and clarify the extent of long-term liabilities.⁴¹ Similarly, governments may also find it appropriate to enact third party access rules in order to reduce the risk of abuse of market power in the context of CO₂ storage sites and infrastructure.⁴²

5. *Carbon Pricing*

Carbon pricing is widely viewed as being an effective and efficient instrument to reduce CO₂ emissions.⁴³ A carbon price may take the

40. Alain-Désiré Nimubona, *Pollution Policy and Liberalization in Environmental Goods*, 53 ENVTL. & RESOURCE ECON. 324 (2012).

41. For a discussion of these types of issues see, e.g., ORG. ECON. CO-OPERATION AND DEV. & INT'L ENERGY AGENCY, *LEGAL ASPECTS OF STORING CO₂, UPDATE AND RECOMMENDATIONS*, (2007), available at http://www.iea.org/publications/freepublications/publication/legal_aspects.pdf; Nigel Bankes et al., *The Legal Framework for Carbon Capture and Storage in Alberta*, 45 ALBERTA L. REV. 585 (2008); Nigel Bankes & Martha M. Roggenkamp, *Legal Aspects of Carbon Capture and Storage*, in *BEYOND THE CARBON ECONOMY: ENERGY LAW IN TRANSITION* 339 (Don Zillman et al. eds., 2008); Nigel Bankes, *Alberta's New Carbon Capture and Storage Legislation*, 1 GREENHOUSE GASES: SCI. & TECH. 134 (M. Mercedes Maroto-Valer & Curtis M. Oldenburg eds., 2011).

42. For a discussion of TPA issues see Martha M. Roggenkamp, *The Concept of Third Party Access Applied to CCS*, in *LEGAL DESIGN OF CARBON CAPTURE AND STORAGE: DEVELOPMENTS IN THE NETHERLANDS FROM AN INTERNATIONAL AND EU PERSPECTIVE* (Martha M. Roggenkamp & Edwijn Woerdman eds., 2009) (discussing DIRECTIVE 2009/31/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 esp. articles 20 and 21); Nigel Bankes & Rick Nilson, *Economic Regulation and the Design of a Carbon Infrastructure for Alberta*, in *ENERGY NETWORKS AND THE LAW* 231–51 (Martha M. Roggenkamp et al. eds., 2012).

43. See, e.g., Gilbert Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499 (2009); Daniel C. Esty & Steve Charnovitz, *Green Rules to Drive Innovation: Charging for carbon can inspire conservation, fuel competition, and enhance competitiveness*, 90 HARV. BUS. REV. 120, 123 (2012); HSU, *A CASE FOR A CARBON TAX*, *supra* note 6, at 192.

form of an explicit price, set by a carbon tax, or may take the form of a market price in a cap-and-trade system of tradable allowances to emit. In either case, emitting GHGs would become costly. Carbon pricing is in effect in the European Union in the form of its European Union Emissions Trading System, and carbon taxation is in effect in various forms in Finland, Sweden, Norway, Denmark, the UK, Australia, and the Canadian province of British Columbia.⁴⁴

Carbon pricing is considered a central element of any effort to make CCS cost-effective.⁴⁵ CCS has no purpose whatsoever if emitting GHGs bears no financial consequences. Financing CCS investments thus requires a payback stream in the form of savings from avoiding a carbon tax by avoiding emissions. That said, this article will not discuss in depth the general subject of carbon pricing and the economic, political, and social aspects of carbon pricing, which is extensively treated elsewhere.⁴⁶ This article will only make a brief point about trade law and carbon pricing to illustrate an interaction between CMTs and international trade law.

III. INTERNATIONAL INVESTMENT LAW AND INTERNATIONAL TRADE LAW THAT MAY CONSTRAIN POLICIES TO PROMOTE CARBON MANAGEMENT TECHNOLOGIES

International investment law and international trade law are commonly thought to pose constraints on environmental policies, and this is no less true of climate policies. Expansive interpretations of the standards of protection afforded foreign investors in international investment law, as well as various uncertainties regarding the interpretation of international trade agreements, may have a constraining effect on governments implementing CMT-promoting policies. The following section considers potential constraints on CMT-promoting policies such as those described in Section II above.

44. David G. Duff & Shi-Ling Hsu, *Carbon Taxation in Theory and Practice*, in CRITICAL ISSUES IN ENVIRONMENTAL TAXATION VOL. VII 261 (Lin-Heng Lye et al. eds., 2010).

45. INTERAGENCY TASKFORCE ON CARBON CAPTURE AND STORAGE, REPORT OF THE INTERAGENCY TASK FORCE ON CARBON CAPTURE AND STORAGE 10 (2010), available at <http://www.fe.doe.gov/programs/sequestration/ccstf/CCSTaskForceReport2010.pdf>.

46. See, e.g., Gilbert Metcalf & David Weisbach, *The Design of a Carbon Tax*, 33 HARV. ENVTL. L. REV. 499 (2009); Esty & Charnovitz, *supra* note 43, at 123; Hsu, *A CASE FOR A CARBON TAX*, *supra* note 6, at 192.

A. International Investment Law and the Regulatory “Chill”

International investment law designed to protect investments may “chill” governments from promulgating regulations that threaten those investments,⁴⁷ which might include CMT-promoting policies. For example, a regulation requiring existing coal-fired power plants to install CCS may be deemed to be a violation of international investment law if it imposes too high of a cost on the foreign investors of the plant. Many of the aspirational goals outlined in international investment agreements—including bilateral investment treaties (BITs)⁴⁸—highlight the role of international investment in achieving objectives such as the effective utilization of economic resources, improving living standards, and the protection of the environment.⁴⁹ But the primary orientation of international investment law is to protect foreign investors and their investments from confiscatory regulation. This orientation may have a

47. This phenomenon—termed “regulatory chill”—has been the subject of many studies which have articulated concerns that IIAs, including BITs and multilateral agreements such as NAFTA, constrain government efforts to pursue a number of legitimate policy objectives, including: (i) the protection of health and the environment, (ii) the preservation of natural resources (such as fresh water), (iii) climate change mitigation, (iv) the promotion of economic development, (v) the regulation of utilities and delivery of government services, (vi) zoning decisions, (vii) reforming health care, and (viii) regulating the financial sector. See, e.g., HOWARD MANN, INTERNATIONAL INVESTMENT AGREEMENTS, BUSINESS AND HUMAN RIGHTS: KEY ISSUES AND OPPORTUNITIES (Feb. 2008), available at http://www.iisd.org/pdf/2008/iaa_business_human_rights.pdf; Vicki Been & Joel C. Beauvais, *The Global Fifth Amendment? NAFTA’s Investment Protections and the Misguided Quest for an International “Regulatory Takings” Doctrine*, 78 N.Y.U. L. REV. 30, 132–35 (2008); Jennifer Gerbasi & Mildred E. Warner, *Privatization, Public Goods, and the Ironic Challenge of Free Trade Agreements*, 39 ADMIN. & SOC’Y 127 (Apr. 2007); Joseph Cumming & Robert Froehlich, *NAFTA Chapter XI and Canada’s Environmental Sovereignty: Investment Flows, Article 1110 and Alberta’s Water Act*, 65 U. TORONTO FAC. L. REV. 107 (2007); Benjamin W. Jenkins, Comment, *The Next Generation of Chilling Uncertainty: Indirect Expropriation Under CAFTA and its Potential Impact on Environmental Protection*, 12 OCEAN & COASTAL L.J. 269 (2007); Matthew C. Porterfield, *International Expropriation Rules and Federalism*, 23 STAN. ENVTL. L.J. 3 (2004); Tracey Epps & Colleen M. Flood, *Have We Traded Away the Opportunity for Innovative Health Care Reform? The Implications of the NAFTA for Medicare*, 47 MCGILL L.J. 747 (2002); Jacob Werksman et al., *Will International Investment Rules Obstruct Climate Protection Policies?* CLIMATE NOTES, Apr. 2001, at 1, available at <http://pdf.wri.org/investrules.pdf>.

48. An agreement governing foreign investment into a nation state. See generally LUKE ERIC PETERSON, *BILATERAL INVESTMENT TREATIES AND DEVELOPMENT POLICY-MAKING* 1 (2004), available at http://www.iisd.org/pdf/2004/trade_bits.pdf.

49. E.g., U.S. Model Bilateral Investment Treaty, 2012, available at <http://www.state.gov/documents/organization/188371.pdf> [hereinafter U.S. Model BIT]; Energy Charter Treaty, preamble, 1995, 2080 U.N.T.S. 95, available at http://www.encharter.org/fileadmin/user_upload/document/EN.pdf [hereinafter ECT]; North American Free Trade Agreement, U.S.-Can.-Mex., preamble, Dec. 17, 1992, 32 I.L.M. 289 (1993) [hereinafter NAFTA].

constraining effect on governments trying to contribute to climate change mitigation goals by promoting CMTs.

Some investor-state arbitral tribunals have taken an investor-friendly position in their interpretation of the standards of protection afforded foreign investors under International Investment Agreements (IIAs). This has been especially true with respect to interpretation of the "fair and equitable treatment" standard.⁵⁰ In particular, a number of cases in the North America Free Trade Agreement (NAFTA) context, including *Metalclad Corporation v United Mexican States*,⁵¹ have triggered concern about the policy space afforded to governments to develop and regulate their economies while protecting their environment.⁵² Expansive interpretations of investment treaty protections may be troubling because they encourage foreign investors to initiate international litigation against governments and expose them to the risk of costly awards.⁵³ Thus, to the extent that governments see the expansion of investor rights under IIAs as a risk, they will likely be all the more cautious about implementing environmental policies that promote CMTs.

The sorts of CMT policies that are most likely to be challenged are those that affect incumbents. For example, an emissions standard that an existing facility can only meet by shutting down or retrofitting for CCS may trigger a challenge on basis of alleged expropriation (or a measure

50. See, e.g., LUKE ERIC PETERSON, *BILATERAL INVESTMENT TREATIES AND DEVELOPMENT POLICY-MAKING* 28–32 (2004), available at http://www.iisd.org/pdf/2004/trade_bits.pdf; see also Jessica C. Lawrence, *Chicken Little Revisited: NAFTA Regulatory Expropriations After Methanex*, 41 GA. L. REV. 261 (2006); ORG. FOR ECON. CO-OPERATION & DEV., *FAIR AND EQUITABLE TREATMENT STANDARD IN INTERNATIONAL INVESTMENT LAW* (2004), available at <http://www.oecd.org/daf/inv/internationalinvestmentagreements/33776498.pdf> (reviewing the broad range of views relating to the interpretation of the fair and equitable treatment standard, defining "fair and equitable treatment as "[t]he obligation to provide 'fair and equitable treatment' is often stated, together with other standards, as part of the protection due to foreign direct investment by host countries. It is an "absolute", "non-contingent" standard of treatment, i.e. a standard that states the treatment to be accorded in terms whose exact meaning has to be determined, by reference to specific circumstances of application, as opposed to the "relative" standards embodied in "national treatment" and "most favoured nation" principles which define the required treatment by reference to the treatment accorded to other investment." *Id.* at 2).

51. *Metalclad Corporation v. United Mexican States*, ICSID Case No. ARB(AF)/97/1, Award, (Aug. 30, 2000), 16 ICSID Rev. 168 (2001), 5 ICSID Rep. 212 (2002).

52. See, e.g., GUS VAN HARTEN, *THE FUTURE OF NORTH AMERICAN TRADE POLICY: LESSONS FROM NAFTA* 43–51 (2009), available at <http://www.bu.edu/pardee/files/2009/11/Pardee-Report-NAFTA.pdf>; see also Marc A. Munro, *Expropriating Expropriation Law: The Implications of the Metalclad Decision on Canadian Expropriation Law and Environmental Land-Use Regulation*, 5 ASPER REV. INT'L BUS. & TRADE L. 75 (2005); Stephan Schill, *Enhancing International Investment Law's Legitimacy: Conceptual and Methodological Foundations of a New Public Law Approach*, 52 VA. J. INT'L L. 57, 61–67 (2011–2012).

53. HARTEN, *supra* note 52, at 44–45.

tantamount to expropriation), a breach of the fair and equitable treatment standard, or the national treatment standard. While much will depend on the facts (is the plant fully amortized, were there any specific undertakings made in relation to emissions levels, are incumbents who are foreign investors differentially treated?) the thrust of the civil society critique of IIAs is that the mere threat of a challenge may cause governments to scale back their ambition in dealing with carbon incumbents.

In some cases governments have taken measures to reduce the risk of overly broad interpretations of investment disciplines. For example, governments can use more precise language in new agreements⁵⁴ or include explicit language that allows governments to justify what might otherwise be characterized as a breach by reference to broad social and environmental objectives.⁵⁵ However, both of these measures speak to the future and new treaty relations rather than existing treaty relations. For existing treaty relations, it is possible that the parties may provide authoritative interpretive guidance as to the terms of the treaty.⁵⁶

B. International Trade Law and Constraints on Subsidies for Carbon Management Technologies

Governments have provided financial support for pilot CCS projects and funded research aimed at capacity building as a way to pro-

54. See, e.g., U.S. Model BIT, *supra* note 49, at 40–41 (contains interpretive annexes designed to confirm the shared understanding of the parties as to the scope of indirect expropriation and the customary law rules relating to the minimum standard of treatment of aliens).

55. See, e.g., Norway Draft Model BIT, footnote to art. 3, 2007, available at <http://www.italaw.com/sites/default/files/archive/ita1031.pdf> (dealing with the national treatment standard and stipulating that: “The Parties agree/[]are of the understanding that a measure applied by a government in pursuance of legitimate policy objectives of public interest such as the protection of public health, safety and the environment, although having a different effect on an investment or investor of another Party, is not inconsistent with national treatment and most favoured nation treatment when justified by showing that it bears a reasonable relationship to rational policies not motivated by preference of domestic over foreign owned investment.”).

56. The best known example of this approach is the interpretive note issued by the three NAFTA parties in relation to the fair and equitable treatment standard in NAFTA Article 1105. See NAFTA FREE TRADE COMMISSION, *Dispute Settlement, Notes of Interpretation of Certain Chapter 11 Provisions* (July 31, 2001), available at <http://www.international.gc.ca/trade-agreements-accords-commerciaux/topics-domaines/disp-diff/nafta-interpr.aspx?lang=eng> (last visited May 3, 2013); see also *Methanex Corporation v. United States*, at ¶¶ 20–21 (2005), available at <http://www.state.gov/documents/organization/51052.pdf> (on the legal status of the Note); RUDOLF DOLZER & CHRISTOPH SCHREUER, *PRINCIPLES OF INTERNATIONAL INVESTMENT LAW* 125 (2008) (pointing out that the subsequent BIT practice of the U.S. and Canada has followed this interpretation).

mote climate policy for many years.⁵⁷ Support of those projects, as well as other projects promoting CMTs, could be considered a subsidy, and thereby provoke a response from trading partners under the *Agreement on Subsidies and Countervailing Measures* (ASCM).⁵⁸ At one time, the ASCM contained provisions defining and exempting non-actionable subsidies, including those pertaining to research, development, and the costs of environmental regulation.⁵⁹ These provisions expired in 1999, however, and are now unenforceable.⁶⁰ There is thus limited scope for justifying subsidization measures aimed at mitigating climate change, including CMT-promoting policies. That said, there is some scope for governments to dispute the applicability of the ASCM to their subsidization measures based on definitional arguments. A discussion of a few possibilities follows.

1. *Provision of Goods and Services in the Form of General Infrastructure*

Article 1 of the ASCM provides that a subsidy exists if there is a "financial contribution by a government or any public body. . .whereby a benefit is conferred."⁶¹ A financial contribution may include: (1) a direct transfer of funds, (2) a situation where a government revenue that is otherwise due is forgone or not collected, and (3) a situation where a government provides goods or services. . .or purchases goods. If a government attempts to make any of the above contributions through a private entity, states can still challenge such contributions under the ASCM.⁶² A CMT-promoting policy could run afoul of Article 1 of the ASCM if it is deemed to contribute goods or services in a way that introduces an unfair advantage for a CMT or a domestic entity, vis-à-vis a foreign competitor. For example, promoting CCS by requiring it of power plants is a legitimate stand-alone policy, but subsidizing by directly supplying inputs to domestic CCS contractors would violate Article 1.

However, if a government provides goods or services in the form of *general infrastructure*, those financial contributions are not considered subsidies as defined under Article 1.1(a)(1)(iii), making the ASCM inap-

57. See IEA ROADMAP, *supra* note 26, at 11.

58. Agreement on Subsidies and Countervailing Measures art. 2, Apr. 15, 1994, 1867 U.N.T.S. 14 [hereinafter ASCM].

59. *Id.* at art. 8.2(a), (c).

60. HUFBAUER, *supra* note 3, at 34, 63–64.

61. ASCM, *supra* note 58, at art. 1.1(a)(1), 1.1(b).

62. *Id.* at art. 1.1(a)(1)(iv).

plicable.⁶³ The parameters of Article 1.1(a)(1)(iii) were recently explored in *European Communities and Certain Member States—Measures Affecting Trade in Large Civil Aircraft*, a dispute in which the United States argued that the governments of Germany, France, Spain and the United Kingdom subsidized the production and marketing of large civil aircraft manufactured by Airbus.⁶⁴ The US challenged infrastructure and infrastructure-related grants to Airbus under Articles 1.1 and 2 of the ASCM. The measures at issue included the provision of: (i) industrial sites; (2) access roads; (iii) lengthened runways; and (iv) grants for the expansion and modernization of facilities in various locations throughout the EC.⁶⁵ In response, the EC argued that all these measures constituted “general infrastructure” within the meaning of Article 1.1(a)(1)(iii) and were therefore not subsidies challengeable under the ASCM.⁶⁶

The Panel held that infrastructure is not inherently “general.”⁶⁷ Thus, in the Panel’s view railroads, highways, and electrical distribution systems do not necessarily constitute “general infrastructure” under the ASCM. Rather, such determinations must be made on a case-by-case basis, “. . . taking into account the existence or absence of *de jure* or *de facto* limitations on access or use, and any other factors that tend to demon-

63. See *id.* at art. 1.1(a)(1)(iii) (the relevant portion of which states that “. . . a subsidy shall be deemed to exist if: . . . a government provides goods or services *other than general infrastructure*, or purchases goods . . .” [emphasis added]).

64. See Panel Report, *European Communities and Certain Member States—Measures Affecting Trade in Large Civil Aircraft*, ¶¶ 4.60 WT/DS316/R (June 30, 2010) [hereinafter *EC-Aircraft Panel Report*]; see generally Appellate Body Report, *European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft*, WT/DS316/AB/R (May 18, 2011) [hereinafter *EC-Aircraft AB Report*].

65. See *EC-Aircraft Panel Report*, *supra* note 64, at ¶¶ 7.1010, 7.1015, 7.1020. The U.S. contended that ‘universal use’ should be the determining factor when deciding whether a government has provided goods or services in the form of general infrastructure. In the U.S. view, the mere fact that a government creates infrastructure for reasons of public policy, to foster economic development, or to perform a public task should not result in the categorization of that infrastructure being ‘general’. *Id.* at ¶7.1015. Similar arguments were made by third parties to the dispute including Australia (*Id.* at ¶¶ 7.1021–7.1022) and Brazil (*Id.* at ¶ 7.1024).

66. *EC-Aircraft Panel Report*, *supra* note 64, at ¶¶ 7.1012, 7.1016–7.1019. The EC disputed the idea that ‘universal use’ of infrastructure as determinative of this issue and argued that infrastructure which benefits society as a whole and promotes economic development policies should meet the definition of general infrastructure. *Id.* at ¶¶ 7.1016–7.1019. Similar arguments were made by Canada, a third party to the dispute. *Id.* at ¶¶ 7.1025–7.1029.

67. See *EC-Aircraft AB Report*, *supra* note 64, at ¶ 968 (on appeal, the Appellate Body re-characterized the nature of the measures at issue as not relating specifically to infrastructure resulting in no need to make a determination as to the application of Article 1.1(a)(1)(iii). As a result, guidance can still be gleaned from the Panel’s decision interpreting “general infrastructure” under that provision of the ASCM).

strate that the infrastructure was or was not provided to or for the use of only a single entity or a limited group of entities.”⁶⁸ According to the Panel, reviewing bodies may examine any number of factors, including: (i) the circumstances surrounding the creation of the infrastructure in question, (ii) consideration of the type of infrastructure, (iii) the conditions and circumstances of the provision of the infrastructure, (iv) the recipients or beneficiaries of the infrastructure, and (v) the legal regime applicable to such infrastructure, including the terms and conditions of access to and/or limitations on use of the infrastructure.⁶⁹ In this case, the Panel determined that providing access roads was the only measure that constituted permissible financial contributions in accordance with Article 1.1(a)(1)(iii) of the ASCM.⁷⁰

How would a government-supported CCS project fare under this analysis? Based on the test set out above, it seems unlikely that the definitional gap in the ASCM will provide governments with much scope to dispute the applicability of that trade agreement to their CCS subsidies. One interesting question might be whether government grants of pore space to CCS projects would fall within the definition of a subsidy or whether such support would be deemed permissible in accordance with Article 1.1(a)(1)(iii) of the ASCM. For example, if a CCS project were designed and operated on the basis of a “utility” model whereby access to the corresponding pore space and infrastructure was available to all owners of CO₂, then ASCM Article 1.1(a)(1)(iii) would render such a project permissible. If, on the other hand, a CCS project were designed and operated with exclusive access rights, then Article 1.1(a)(1)(iii) of the ASCM may be less likely to apply.

2. Actionable Subsidies

Measures that fall within the definition of a “financial contribution” must still confer a benefit in order to be deemed a subsidy under Article 1.1 of the ASCM. The subsidy must then be “specific” to certain enterprises or industries.⁷¹ Once a measure has been found to be “specific” under ASCM, it is necessary to determine whether that measure causes “adverse effects” to the interests of one WTO member.⁷² If those preconditions are satisfied, the subsidy will be “actionable.” Subsidies that are contingent on exports or domestic content requirements are

68. *EC-Aircraft Panel Report*, *supra* note 64, at ¶ 7.1039.

69. *Id.* at ¶ 7.1039.

70. *Id.* at ¶¶ 7.1192–7.1196.

71. ASCM, *supra* note 58, at arts. 1.2, 2.

72. *Id.* at art. 5.

“prohibited” under the ASCM.⁷³ In those cases, WTO law assumes that damage has been done to other economies. As a result, proof of specificity and an “adverse effect” are not required.

a. Specificity

In some cases, establishing specificity will be relatively easy; the granting authority or legislation will expressly limit a subsidy’s access to certain enterprises. Other cases will be far less clear. Under Article 2.1(b) of the Uruguay Round Subsidies Agreement, specificity will not be established if eligibility of the subsidy is contingent on “criteria or conditions which are neutral, which do not favor certain enterprises over others, and which are economic in nature and horizontal in application, such as number of employees or size of enterprises.”⁷⁴ The Uruguay Round Agreement is an agreement made by the WTO. Some scholars have suggested that this provision could provide governments with some policy space to pursue renewable energy goals.⁷⁵ Still others have observed that governments designing subsidies in accordance with the criteria outlined in Article 2.1(b) may still encounter problems under the ASCM.⁷⁶ Given the prominence of the *de facto* analysis of specificity, it is difficult to imagine a scenario in which the test of specificity would not be met. Indeed, it appears that the specificity analysis under Article 2 of the ASCM inevitably has a constraining effect on states trying to support

73. *Id.* at art. 3.

74. *Id.* at art. 2.1

75. See, e.g., Sadeq Z. Bigdeli, *Resurrecting the Dead? The Expired Non-Actionable Subsidies and the Lingering Question of ‘Green Space’*, 8 MANCHESTER J. INT’L ECON. L. 2, 23–27 (2011) (suggesting an energy saving subsidy or subsidies for consumers of renewable energy as examples of subsidies that could meet the requirements of Article 2.1(b)).

76. Professor Rubini notes that despite strict compliance with Article 2.1(b), governments still face policy, and legal, based hurdles when implementing renewable energy subsidies. Specifically, Professor Rubini notes that a subsidy in compliance with Article 2.1(b) may still be found to be specific under Article 2.1(c) if there is evidence that the subsidy *de facto* benefits certain enterprises or industries. In assessing whether a subsidy is *de facto* specific under Article 2.1(c), WTO case law offers little guidance for governments designing their subsidy programs. While something less than universal eligibility can lead to a finding of non-specificity, a large number of enterprises or industries affected by a subsidy will not necessarily establish that it has general application. See Luca Rubini, *Ain’t Wastin’ Time No More: Subsidies for Renewable Energy, the SCM Agreement, Policy Space and Law Reform*, 15 J. INT’L ECON. L. 525, 548–49 (2012); Panel Report, *United States—Measures Affecting Trade in Large Civil Aircraft Second Complaint*, ¶ 7.762, WT/DS353/R (Mar. 31, 2011); Panel Report, *United States—Final Countervailing Duty Determination with Respect to Certain Softwood Lumber from Canada*, ¶¶ 7.115–7.122, WT/DS257/R (Aug. 29, 2003).

environmental policies of any kind, let alone those measures that would promote CMTs.⁷⁷

b. Adverse Effects

Specific subsidies may be actionable only in circumstances where a WTO member suffers adverse effects. Article 5 of the ASCM articulates a number of tests for determining when an adverse effect has occurred, including: (i) injury to the domestic industry; (ii) nullification or impairment of benefits accruing directly or indirectly to other members (i.e. tariff concessions); or (iii) serious prejudice to the interests of another member. Factors to consider when examining whether a WTO member has suffered serious prejudice as a result of a subsidy are further articulated in Article 6 of the ASCM.⁷⁸ Subsidies may cause harm in a variety of ways, creating a need for very fact-specific examinations of harm. Such case-by-case considerations suggest some flexibility within the ASCM and perhaps provide governments with scope to support environmental objectives, like promoting CMTs. For example, it seems possible that a subsidy implemented to promote CMTs like a consumption subsidy or energy-saving subsidy, which does not discriminate with respect to the origin of the energy or technology, may survive the adverse effects analysis. Still, a government's desire to maneuver within this limited and uncertain space will undoubtedly be determined by its willingness to assume the legal risks of possible WTO litigation.

77. See Rubini, *supra* note 76, at 548; INT'L INST. FOR SUSTAINABLE DEV., TRADE AND CLIMATE CHANGE: ISSUES IN PERSPECTIVE 22–24 (Aaron Cosbey ed., 2008); see also HUFBAUER, *supra* note 3, at 61; EPPS & GREEN, *supra* note 4, at 114–15 (many subsidies targeting climate change are likely specific in that they are disproportionately accessed by certain industries).

78. Article 6 of the ASCM provides in part: "Serious prejudice in the sense of paragraph (c) of Article 5 may arise in any case where one or several of the following apply:

- (a) the effect of the subsidy is to displace or impede the imports of a like product of another Member into the market of the subsidizing Member;
- (b) the effect of the subsidy is to displace or impede the exports of a like product of another Member from a third country market;
- (c) the effect of the subsidy is a significant price undercutting by the subsidized product as compared with the price of a like product of another Member in the same market or significant price suppression, price depression or lost sales in the same market;
- (d) the effect of the subsidy is an increase in the world market share of the subsidizing Member in a particular subsidized primary product or commodity 17 as compared to the average share it had during the previous period of three years and this increase follows a consistent trend over a period when subsidies have been granted.

ASCM, *supra* note 58, at arts. 6.3.

C. International Trade Law and Constraints on Regulations That Promote Carbon Management Technologies

One option for addressing climate change available to governments is to impose mandatory emission or energy efficiency standards on a product or production process. Regulations usually outline specific GHG emission or energy efficiency levels or require the use of particular technology, such as CCS.⁷⁹ One such regulation that has garnered particular attention over the past year is the proposed European Fuel Quality Directive (EFQD).⁸⁰

The proposed EFQD is one of the ways in which Europe hopes to meet its commitment to a 20 percent reduction in carbon emissions by 2020.⁸¹ Specifically, the EFQD will require suppliers of transport fuels to reduce the life cycle GHG intensity of their products by six percent by 2020, relative to 2010 carbon emissions levels.⁸² To help achieve this goal, the EFQD differentiates among transportation fuels based on the physical properties of the feedstock from which they are produced. For example, fuels produced from shale oil and fuels produced from bitumen (i.e. unconventional feedstocks) are distinguished from fuels derived from conventional oil. A proposed implementation measure of the EFQD would allocate default GHG emission values to transportation fuels based on the life cycle GHG intensity of each fuel's feedstock source or category.⁸³ Those default values would then be used to determine whether European transport fuel suppliers have met the EFQD's six percent carbon emissions reduction target.

79. Note: there are other possible regulatory options that states may rely on including labeling requirements, domestic emissions trading programs. Those regulatory options are not discussed in detail here.

80. See, e.g., Max Paris, *EU Delays 'Anti-Oilsands' Fuel Quality Directive Decision*, CBC NEWS, Apr. 20, 2012, <http://www.cbc.ca/news/politics/story/2012/04/20/pol-fuel-directive-europe-canada.html> (last visited May 3, 2013); see also Matthew Ducharme, *The European Fuel Quality Directive: Will it Stay or Will it Go?*, THE UNIV. OF CALGARY FACULTY OF L. BLOG ON DEVELOPMENTS IN ALBERTA L. (Mar. 12, 2012), <http://ablawg.ca/2012/03/12/the-european-fuel-quality-directive-will-it-stay-or-will-it-go/> (last visited May 3, 2013).

81. Commissioner for Climate Action, *The EU Climate and Energy Package*, http://ec.europa.eu/clima/policies/package/index_en.htm (last updated Sept. 10, 2012).

82. Directive 2009/30/EC of The European Parliament and of The Council of 23 April 2009 amending Directive 98/70/EC as regards the specification of petrol, diesel and gas-oil and introducing a mechanism to monitor and reduce greenhouse gas emissions and amending Council Directive 1999/32/EC as regards the specification of fuel used by inland waterway vessels and repealing Directive 93/12/EEC, art. 7(a)(2), 2009 O.J. (L140/88).

83. EFQD Draft Directive, *supra* note 33.

While the proposed EFQD could effectively reduce GHG emissions⁸⁴ (and encourage the use of CMTs), the proposed regulation has not received unanimous support. The Government of Canada, which produces oil from its Albertan "oil sands" in a relatively carbon-intensive process, took issue with distinctions made between unconventional and conventional fuel sources under the EFQD.⁸⁵ Canada has argued that by assigning Canadian oil sands crude a GHG intensity value that is higher than that of other heavy crudes, the EFQD effectively precludes oil sands crude and any associated products from being sold on the EU market.⁸⁶

Using the EFQD as backdrop, the following discussion considers the elements that constrain government policy space in the national treatment and necessity provisions of the Technical Barriers to Trade Agreement (TBT).⁸⁷ Before delving into that discussion, however, it is necessary to make a preliminary observation about the national treatment disciplines in the TBT and General Agreement on Tariffs and Trade (GATT).⁸⁸ There are significant overlaps between the national treatment provisions of the TBT Agreement and GATT Article III:4, leading to questions about the relationship between GATT and the TBT Agreement.⁸⁹ WTO jurisprudence has done little to clarify that relationship.⁹⁰ In more recent cases, the Appellate Body has declined to make findings under Article III of GATT once a measure has been found to be inconsis-

84. See, e.g., P.J. Partington & Marc Huot, *Oilsands, Heavy Crudes, and the EU Fuel-Quality Directive*, THE PEMBINA INSTITUTE (Mar. 2012), available at <http://www.pembina.org/pub/2325>.

85. Paris, *supra* note 80.

86. Natural Resources Canada, *Fuel Quality Directive*, <http://www.nrcan.gc.ca/media-room/news-release/2012/30a/6062> (last updated March 14, 2012).

87. See Agreement on Technical Barriers to Trade, Apr. 15, 1994, 1868 U.N.T.S. 120 [hereinafter TBT]; It is important to note that the TBT Agreement may pose other constraints on the space afforded governments wanting to implement policies that would promote CMTs. For example, under the TBT Agreement there are procedural requirements that states must adhere to when developing regulations. The constraints posed by those aspects of the TBT Agreement are not discussed here. For an examination of those aspects of the TBT Agreement, see Andrew Green, *Climate Change, Regulatory Policy and the WTO: How Constraining are the Trade Rules?*, 8 J. INT'L ECON. L. 143, 169-73 (2005).

88. See General Agreement on Tariffs and Trade, Apr. 15, 1994, 1867 U.N.T.S. 187, 33 I.L.M. 1153 [hereinafter GATT].

89. Green, *supra* note 87, at 154 (observing that the same three issues must be addressed when determining whether there is a violation of the national treatment provisions under GATT Article III:4 and the TBT Agreement).

90. See Marrakesh Agreement Establishing the World Trade Organization, General Interpretive Note to Annex IA, Apr. 15, 1994, 1867 U.N.T.S. 154 (in the event of a conflict, the provisions of agreements such as the TBT Agreement prevail over GATT provisions).

tent with the TBT Agreement.⁹¹ Accordingly, it seems likely that if a measure is challenged under both agreements, claims under the TBT Agreement will be considered before claims made under GATT. As a result, the following discussion centers on the TBT Agreement and posits that, while the TBT Agreement recognizes that governments have the right to implement regulatory measures like the EFQD,⁹² there remains a significant degree of uncertainty regarding the validity of each specific measure and hence a corresponding risk that such measure could be successfully challenged under the TBT Agreement.

1. National Treatment

Article 2.1 of the TBT Agreement requires technical regulations to treat imported products no less favorably than like domestic products.⁹³ There are three elements that must be established in order to find a violation of this provision, namely: (i) that the measure at issue constitutes a “technical regulation” within the meaning of Annex 1.1, (ii) that the imported products are “like” the domestic product and the products of other origin, and (iii) that the treatment accorded to imported products is less favorable than that accorded to like domestic products and like products from other countries.⁹⁴

a. Defining a Technical Regulation

The Appellate Body has outlined three characteristics that define whether a measure will be considered a “technical regulation.” Specifically, the measure at issue must: (i) apply to an identifiable product or group of products either explicitly or implicitly, (ii) mandate the charac-

91. See, e.g., Appellate Body Report, *United States – Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products*, ¶ 406, WT/DS381/AB/R (May 16, 2012) [hereinafter *US-Tuna II* AB Report].

92. See TBT, *supra* note 87, at preamble ¶ 6 (which states “. . . no country should be prevented from taking measures necessary. . . for the protection of human, animal or plant life or health, of the environment, or for the prevention of deceptive practices, at the levels it considers appropriate . . .”); see also Appellate Body Report, *European Communities – Measures Affecting Asbestos and Asbestos-Containing Products*, ¶ 61, WT/DS135/AB/R (Mar. 12, 2001) [hereinafter *EC-Asbestos* AB Report] (where in the context of domestic regulatory sovereign and health policy the AB stated that “it is undisputed that WTO members have the right to determine the level of protection of health that they consider appropriate in a given situation.”).

93. Article 2.1 requires “[m]embers [to] ensure that in respect of technical regulations, products imported from the territory of any Member shall be accorded treatment no less favorable than that accorded to like products of national origin . . .”. TBT, *supra* note 87, at 121–22.

94. Appellate Body Report, *United States – Measures Affecting the Production and Sale of Clove Cigarettes*, ¶ 87, WT/DS406/AB/R (Apr. 4, 2012).

teristics, including the definable features, qualities, attributes or other distinguishing marks of a product or group of products, and (iii) require mandatory compliance with the product characteristics.⁹⁵ Given this broad interpretation, most of a government's regulatory measures mandating emission or energy efficiency characteristics of a product, such as the EFQD, will likely fall under the TBT Agreement.

b. Likeness

Once a measure is considered under Annex IA to be a "technical regulation" Article 2.1 of the TBT Agreement links a state's national treatment obligation to the concept of "likeness". Specifically, Article 2.1 provides that a government's non-discrimination obligation only relates to "like" products. While GATT jurisprudence has considered the concept of "likeness,"⁹⁶ the interpretive analysis to be used under the TBT has only recently been clarified, with the WTO Panel in *US-Tuna II* adopting the test for likeness that is used in GATT Article III:4.⁹⁷ As a result, the likeness of products will be informed by: (i) the product's physical properties, (ii) product's end-uses, (iii) consumers' tastes and habits in relation to the products, and (iv) the international tariff classification.⁹⁸ The analysis of likeness under Article 2.1 will focus on whether there is a competitive relationship between imported and domestic products.⁹⁹

95. See *EC-Asbestos* AB Report, *supra* note 92, at ¶¶ 26–29 (where the AB found that a ban on asbestos fell under the TBT Agreement because it related to identifiable products and mandated product characteristics); see also Appellate Body Report, *European Communities – Trade Description of Sardines*, ¶¶ 175–86, WT/DS231/AB/R (Sept. 26, 2002) (where the Appellate Body applied the same test and found that regulations specifying that only a certain type of sardines could be marketed as "preserved sardines" were covered under the TBT Agreement).

96. See, e.g., Appellate Body Report, *Japan—Taxes on Alcoholic Beverages*, at 19–23, WT/DS8/AB/R (Oct. 4, 1996) [Hereinafter *Japan-Alcohol* AB Report] (where the Appellate Body emphasized the flexible nature of the concept of "likeness" within GATT and indicated that it may be interpreted differently depending on the GATT provision at issue in any given case); *EC-Asbestos* AB Report, *supra* note 92, at ¶ 99 (where the Appellate Body distinguished between "likeness" under GATT Article III:2 and GATT Article III:4).

97. See Panel Report, *United States—Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products*, ¶¶ 7.223–7.224, WT/DS381/R (Sep. 15, 2011) [hereinafter *US-Tuna II* Panel Report] (where the Panel adopted a shared definition of "likeness" between GATT Article III:4 and the TBT based on their shared anti-protectionist purposes); see also *US-Tuna II* AB Report, *supra* note 91, at ¶ 202 (where the Appellate Body indicated that the US did not appeal the Panel's finding the Mexican tuna products were "like" US tuna products, thereby indicating its acceptance of the shared "likeness" test between GATT Article III:4 and the TBT Agreement).

98. *EC-Asbestos* AB Report, *supra* note 92, at ¶ 101.

99. *US-Tuna II* Panel Report, *supra* note 97, at ¶ 7.224.

That emphasis on competition as a fundamental quality of likeness has, however, been criticized on the grounds that it places unnecessary constraints on a government's policy space. The test for "likeness" under Article III:4 ignores the economic theory of regulation, which suggests that governments tend to implement regulations when consumers do not differentiate between goods that the government considers distinguishable.¹⁰⁰ It might be possible to argue that such concerns were addressed in *EC-Asbestos*, where the Appellate Body took health risks into account when considering the "likeness" of certain goods.¹⁰¹ However, where such arguments can be made (e.g. that products are not like because the attributes of one product are associated with health or environmental risks while the other good's attributes do not have similar consequences), evidence of consumer tastes and habits is still relevant to determinations of "likeness."¹⁰² Consequently, products may still be considered "like" if they pose different health or environmental risks and there is evidence that consumers do not consider those factors relevant when behaving in the market.¹⁰³

In the case of the EFQD, a likeness analysis would undoubtedly be complicated and based on a number of factors, including: (i) the fuels being compared, including the physical properties of the corresponding feedstocks, (ii) the fuel's end-uses, (iii) market evidence (if any) of consumer tastes and habits regarding different types of fuel, and (iv) the tariff classifications given to the fuels being compared. It is beyond the scope of this article to provide a complete likeness analysis, other than to note that the EU would want any likeness analysis to compare fuels that are more easily distinguishable in terms of their GHG emissions intensity, density and viscosity. For example, the EU may be more comfortable with a likeness analysis that compares bitumen with conventional crude oil as such a comparison is more likely to support the distinctions it has made between fuels in the EFQD and its implementing measure. In contrast, should Canada challenge a measure like the EFQD, it will want

100. See, e.g., Gabrielle Marceau & Joel Trachtman, *The Technical Barriers to Trade Agreement, the Sanitary and Phytosanitary Measures Agreement, and the General Agreement on Tariffs and Trade: A Map of the World Trade Organization Law of Domestic Regulation of Goods*, 36 J. WORLD TRADE 811, 818–19 (2002).

101. *EC-Asbestos* AB Report, *supra* note 92, at ¶¶ 113–26, 130, 145–47 (where the AB determined that asbestos (chrysotile) fibres were not "like" PCG (polyvinyl alcohol, cellulose and glass) fibres and that cement products containing those fibres were not like).

102. *Id.* at ¶¶ 113–26.

103. The recent *US-Tuna II* WTO decisions arguably go further than this by finding that distinctions made in regulations about the labeling of tuna products based on different fishing methods (some more harmful to dolphins than others) used to catch tuna had no bearing on the "likeness" of tuna products, despite an established consumer preference for products with the 'dolphin-safe' label, see *US-Tuna II* AB Report, *supra* note 91, at ¶ 233.

to argue for a likeness analysis that compares fuels that are more similar (i.e. heavy crude and bitumen) to demonstrate the arbitrary nature of the differentiations made between fuels under the EFQD. It is uncertain, however, which approach a WTO dispute settlement body would take in examining the likeness of fuels for the purpose of determining whether the EFQD complies with international trade law. It is this uncertainty that may have a constraining effect on a government's ability to implement policies like the EFQD, which promote the use of CMTs. As observed above in the context of subsidization for CMTs, a government's willingness to operate within the ambiguities of this aspect of the TBT Agreement will undoubtedly relate, in part, to its willingness take on the risks associated with those uncertainties (i.e. litigation challenging their regulation at the WTO).

c. No Less Favorable Treatment

If domestic and imported products are found to be "like," a WTO Panel or Appellate Body will consider whether the imported product is accorded treatment "no less favorable" than the domestic product.¹⁰⁴ Similar to the analysis of non-discrimination seen in GATT Article III:4, formal regulatory distinctions or differences in treatment between imported and domestic goods are not enough to violate TBT Article 2.1. Rather, the analysis centers on whether: (i) a government's measure adversely modifies the conditions of competition for imported products vis-à-vis domestic goods, and (ii) the detrimental impact of that measure reflects discrimination.¹⁰⁵ Thus, determinations of whether there is "less favorable treatment" under TBT Article 2.1 are undoubtedly fact-specific with WTO dispute settlement bodies considering the scope and structure of a government's regulatory measure to determine if the distinctions made between imported and domestic goods adversely impact imports. What remains unclear, however, is whether a violation of the "less favorable treatment" standard will be found only in cases where there is evidence of a government's protectionist intent or whether violations will be found regardless of a government's legitimate intentions, such as protecting the environment.

As is true of the adverse effects analysis under the ASCM Agreement, such case-by-case considerations can evince a certain amount of flexibility under the TBT Agreement for governments to pursue their environmental policy goals through regulations like the EFQD. Indeed, such an examination may also be beneficial in rooting out hidden protec-

104. *US-Tuna II* AB Report, *supra* note 91, at ¶ 229.

105. *US-Tuna II* AB Report, *supra* note 91, at ¶¶ 233–98.

tionist goals.¹⁰⁶ On the other hand, a government's desire to manoeuvre within this uncertain space will undoubtedly be informed by its willingness to entertain the legal risks that a WTO body would question the legitimacy of their regulatory goals.¹⁰⁷ Current WTO jurisprudence considering Article 2.1 appears to support the proposition that the "less favorable treatment test" may have a more constraining effect on the choices available to governments when implementing regulatory measures for environmental purposes. In the recently decided *US-Tuna II*, US regulations regarding dolphin-safe labeling were found to discriminate against Mexican Tuna despite the fact that one of the objectives pursued by the US measure was the protection of dolphins.¹⁰⁸ That finding in *US-Tuna II* suggests that even finding that one of the goals of the EFDQ is to reduce GHG emission would not be sufficient to overcome the less favorable treatment test under TBT Article 2.1.

2. Necessity

In addition to Article 2.1, measures must also be consistent with Article 2.2 of the TBT Agreement, which authorizes WTO members to implement technical regulations so long as they are "not . . . more trade-restrictive than necessary to fulfill a legitimate objective," with the protection of the environment expressly recognized as a legitimate objective.¹⁰⁹ While WTO members are able to set their own level of protection,¹¹⁰ the analysis under this provision involves the balancing of a number of considerations, including: (i) the contribution made by the measure at issue to a government's legitimate objective, (ii) the trade-restrictiveness of the measure at issue, and (iii) the importance of the

106. See Robert Howse & Elizabeth Tuerk, *The WTO Impact on Internal Regulations – A Case Study of Canada – EC Asbestos Dispute*, in *THE EU AND THE WTO: LEGAL AND CONSTITUTIONAL ISSUES* 283, 285 (G. de Burca & J. Scott eds., 2001) (where the authors consider the ramifications of the "so as to afford protection" analysis under Article III:4).

107. See, e.g., Marceau, *supra* note 100, at 855 (where, in the context of GATT Article III:4, the authors note that the "so as to afford protection" analysis inevitably means that WTO dispute settlement bodies must carry out, either explicitly or implicitly, a discretionary balancing between trade and other objectives); see also Robert E. Hudec, *GATT/WTO Constraints on National Regulation: Requiem for an 'Aims and Effects' Test*, 32 *INT'L LAW.* 619, 634 (1998) (where the author notes that WTO Panels will not explicitly engage in a balancing between trade and other objectives, like the environment. Instead, such analyses will be hidden with the result that the degree of deference given to government regulators is left to a largely non-transparent exercise of discretion by WTO decision-makers).

108. *US-Tuna II* AB Report, *supra* note 91, at 2 (disagreeing with *US-Tuna II* Panel Report, *supra* note 97).

109. TBT, *supra* note 87, at art. 2.2.

110. See *EC-Asbestos* AB Report, *supra* note 92, at ¶ 168.

objective and the gravity of consequences from failing to meet the objective.¹¹¹

The type of evidence a state will need to show it relied upon to make certain regulatory decisions is central to this balancing test. Unlike the Agreement on the Application of Sanitary and Phytosanitary measures (SPS Agreement), which requires a scientific basis for government measures intended to protect human, plant or animal health,¹¹² Article 2.2 of the TBT Agreement indicates that when assessing risks, relevant considerations include available "scientific and technical information." Admittedly less onerous than the requirement for scientific evidence under the SPS Agreement,¹¹³ the standard of proof that a WTO Panel or Appellate Body will impose upon governments wanting to promote CMTs will be key to determining the validity of measures under the TBT Agreement. If the need for scientific evidence under the TBT is rigorously required by WTO dispute settlement bodies, states will have less policy space to implement environmental measures aimed at combating climate change. If, on the other hand, a less onerous approach is accepted regarding the need for scientific evidence as a basis for a government's regulatory decisions, then it seems clear that there will be more policy space for states to implement environmental measures for the purpose of climate change mitigation.¹¹⁴

As with many analyses in international trade law, determining whether measures like the EFQD would survive a challenge under Article 2.2 of the TBT Agreement depends on how a WTO panel or the Appellate Body assesses a number of factors. In challenging the EFQD, Canada, for example, is likely to present scientific evidence questioning the GHG intensity values assigned to unconventional and conventional fuel sources under the EFQD. Additionally, Canada may tender scientific evidence that questions whether a measure aimed at GHG emissions from different transportation fuels is even able to meaningfully contribute to the mitigation of climate change. In the face of what it considers

111. *US-Tuna II* AB Report, *supra* note 91, at ¶ 322.

112. See WTO Agreement on the Application of Sanitary and Phytosanitary Measures art. 2.2, Apr. 15, 1994, 1867 U.N.T.S. 493 [hereinafter SPS Agreement] (which requires that decisions on measures be "based on scientific principles and . . . not maintained without sufficient scientific evidence.").

113. Decisions under the SPS Agreement have tended to impose high standards regarding the necessity for scientific evidence, with the Appellate Body determining that the science relied upon by the regulating state was inadequate in a number of cases: see, e.g., Appellate Body Report, *European Communities—Measures Concerning Meat and Meat Products (Hormones)*, WT/DS26/AB/R (Jan. 16, 1998); Appellate Body Report, *Japan—Measures Affecting Agricultural Products*, WT/DS76/AB/R (Oct. 27, 1998) (adopted Feb. 22, 1999).

114. See Alan O. Sykes, *Domestic Regulation, Sovereignty, and Scientific Evidence Requirements: A Pessimistic View*, 3 CH. J. INT'L L. 353, 354 (2002).

tenuous scientific evidence, Canada will argue that the EFQD is too trade-restrictive because it effectively bans unconventional fuels from the EU market. In support of its measure, the EU is likely to argue that the EFQD contributes to the reduction of GHG emissions and thereby fulfills a legitimate environmental objective—climate change mitigation. In support of this contention, Europe will point to scientific evidence that speaks to the existence of climate change as a global challenge and the consequences that will arise if governments do not implement measures to address this problem.¹¹⁵ As part of this discussion, the EU would likely tender evidence supporting the distinctions made between different transport fuels under the EFQD. Thus, the EU would further argue that its measure is an appropriate step toward climate change mitigation without being unduly trade restrictive. How a WTO dispute settlement body will weigh all of these arguments, however, remains uncertain. As noted above, this uncertainty may have a constraining effect on a government's ability to implement policies like the EFQD. The greater the latitude a government exercises in regulating, the greater the risk that such regulations will be challenged under the TBT Agreement.

3. *Justifying Measures that Promote Carbon Management Technologies*

Despite constraints on CMT-promoting policies, a government may be able to implement its policies by invoking provisions that justify them within WTO law. The most obvious example is Article XX of the GATT.¹¹⁶ Article XX explicitly recognizes that trade concerns will not always take priority over other legitimate public policy objectives like protecting the environment.¹¹⁷ In so doing, Article XX gives practical meaning to the aspirations of the WTO, which make reference to the international trade law regime as a means by which countries may promote the sustainable development of world resources and protect the environment.¹¹⁸ Whether Article XX can be used as a mechanism for the promotion of such goals in relation to measures falling under WTO agreements other than GATT is a heavily debated proposition.¹¹⁹ The nuances of those arguments are outside the scope of this article except to note that if Article XX is inapplicable beyond GATT, governments trying

115. See, e.g., IEA ROADMAP, *supra* note 26, at 1.

116. See, e.g., GATT, *supra* note 88, at art. XX; accord General Agreement on Trade in Services art. XIV, Apr. 15, 1994, 1869 U.N.T.S. 183.

117. PETER VAN DEN BOSSCHE, *THE LAW AND POLICY OF THE WORLD TRADE ORGANIZATION: TEXT, CASES AND MATERIALS* 616 (2d ed. 2008).

118. GATT, *supra* note 88, at Art. XX.

119. See, e.g., Rubini, *supra* note 76, at 561–66.

to implement climate change mitigation measures subject to other WTO agreements—like the ASCM and TBT Agreements—will likely have a more constrained policy space within which to work. The following discussion proceeds on the assumption that Article XX has some applicability to government subsidies and regulations intended to promote CMTs.

WTO panel or the Appellate Body will analyze a government measure intended to promote CMTs under Article XX in two steps.¹²⁰ First, it will first determine if the measure falls within one of the specified exceptions under Article XX.¹²¹ Second, if the measure can tentatively be justified on the basis of one of those exceptions, it is then examined under the Chapeau, or introductory clause, of Article XX.¹²² Early jurisprudence considering environmental measures interpreted Article XX narrowly, making it difficult for governments to justify their environmental measures within the trade law regime.¹²³ More recent jurisprudence suggests that the international trade law regime is increasingly recognizing the need for governments to have some policy space to implement environmental measures (such as those related to the promotion of CMTs) and be able to justify those measures under Article XX.¹²⁴ As discussed below, WTO dispute settlement bodies have been more willing to apply Article XX to measures that have environmental policy objectives and have relaxed their interpretation of the “necessity” requirement under Article XX(b). Nevertheless, aspects of the Article XX analysis remain difficult to overcome and are therefore likely to constrain a government’s environmental policy space.

120. See, e.g., Appellate Body Report, *United States—Standards for Reformulated and Conventional Gasoline*, at ¶ 13, WT/DS2/AB/R (Apr. 29, 1996) (adopted Mar. 20, 1996) [hereinafter *US-Gasoline AB Report*].

121. See *id.*

122. See *id.* at 20.

123. See, e.g., Panel Report, *United States—Restrictions on Imports of Tuna*, ¶ 5.22, DS21/R (Sep. 3, 1991) (not adopted) GATT B.I.S.D. (39th SUPP.) at 155 (1993) [hereinafter *US-Tuna I Panel Report*] (determining that an import ban of certain tuna from countries whose tuna fishing vessels used nets that endangered dolphins could not be justified under Article XX because the measure was an impermissible quantitative restriction that operated outside of US territory); see also Panel Report of the Panel, *United States—Restrictions on Imports of Tuna*, ¶¶ 5.27, 5.39, DS29/R (Jun. 16, 1994) (GATT) (not adopted) [hereinafter *US-Tuna (EEC) Panel Report*] (determining that same measure challenged in *US-Tuna I Panel Report* could not be justified under Articles XX(b) or XX(g) because essential conditions of these provisions were not met).

124. See Joost Pauwelyn, *US Federal Climate Policy and Competitiveness Concerns: The Limits and Options of International Trade Law* 28 (Nicholas Institute for Environmental Policy Solutions, Duke University, Working Paper NI-WP 07/02, 2007), available at <http://nicholasinstitute.duke.edu/climate/policydesign/u.s.-federal-climate-policy-and-competitiveness-concerns-the-limits-and-options-of-international-trade-law/> (citing the *US-Superfund* case as an example of how a panel might not have to reach the Article XX exception analysis).

a. Environmental Policy Objectives Under Article XX(b) and XX(g)

Articles XX contains two justifications relevant to environmental policy objectives, including the promotion of CMTs. Article XX(b) permits a WTO member to maintain otherwise GATT-illegal measures if doing so is “necessary to protect human, animal, or plant life or health.”¹²⁵ In contrast, Article XX(g) allows a WTO member state to justify measures that “relat[e] to the conservation of exhaustible natural resources” if such measures are “made effective in conjunction with restrictions on domestic production or consumption.”¹²⁶ Significantly, measures addressing environmental policy concerns including climate change¹²⁷ and the protection of clean air as an exhaustible natural resource¹²⁸ have been recognized as measures that may be covered by GATT Articles XX(b) and XX(g) respectively. Thus, in contrast to earlier jurisprudence which tended to focus on the trade implications of a measure without regard to its environmental objectives, the current case law examining Articles XX(b) and XX(g) strikes more of a balance between the goals of trade liberalization and environmental protection. As a result, it seems possible that a measure focused on the promotion of CMTs could be provisionally justified under either (or both) Articles XX(b) and XX(g).¹²⁹

b. Necessity & Relatedness Under Articles XX(b) and XX(g)

The crucial language in Articles XX(b) and XX(g) are “necessary to” and “relating to.” The analysis under XX(b) is stricter than that the analysis under XX(g). For a time, “necessity” under Article XX(b) was stringently interpreted. WTO panels found that measures could only be justified under this provision if they were the least trade restrictive measures reasonably available to a state.¹³⁰ More recently, the Appellate Body expanded on this analysis and determined that the current test for “necessity” promotes the weighing and balancing of a number of factors,

125. General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A-11, 55 U.N.T.S. 194, art. XX(b), available at http://www.wto.org/English/docs_e/legal_e/gatt47_02_e.htm.

126. *Id.* art. XX(g).

127. See Appellate Body Report, *Brazil—Measures Affecting Imports of Retreaded Tyres*, ¶ 151, WT/DS332/AB/R (Dec. 3, 2007) [hereinafter *Brazil-Tyres AB Report*].

128. See *US-Gasoline AB Report*, *supra* note 120, at 8.

129. WTO jurisprudence indicates these two provisions are distinct. In order for a WTO member to justify policies which promote CMTs under Article XX(b) it will need to provide evidence that the measure contributes to the protection of human, animal or plant life or health specifically; arguments that a measure contributes to broad environmental protection objectives will not be considered compelling under XX(b). See Panel Report, *Brazil—Measures Affecting Imports of Retreaded Tyres*, ¶ 7.46, WT/DS332/R (Jun. 12, 2007).

130. See, e.g., Panel Report, *United States—Sect. 337 of the Tariff Act of 1930*, ¶¶ 5.25–5.26 L/6439 (Jan. 16, 1989) GATT B.I.S.D. (36th Supp.) at 345.

including: (i) the contribution made by the (non-indispensable) measure to a government's legitimate objective; (ii) the importance of the common interests or values protected; and (iii) the impact of the measure on trade.¹³¹ While the analysis under Article XX(g) and its "relatedness" requirement is less stringent than "necessity" under Article XX(b), a government justifying its measures under Article XX(g) will still need to demonstrate a "close and genuine relationship of ends and means" which is not "disproportionately wide in its scope and reach".¹³² Additionally, so long as the measure is even handed in relation to domestic measures, the 'effective in conjunction' requirement should be met.¹³³

c. Article XX Chapeau

A measure that can be provisionally justified under one of Article XX's subparagraphs must still be considered under the Article XX chapeau. The chapeau, an important introductory clause to Article XX,¹³⁴ prevents states from abusing the Article XX exceptions, and some consider the chapeau "the most important provision in [GATT]."¹³⁵ Under the chapeau a measure must not be applied "in a manner that constitutes a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail" and must not be "a disguised restriction on trade."¹³⁶

In contrast to the analysis that takes place under Article XX's subparagraphs, an examination of measures aimed at the promotion of CMTs under the chapeau focuses on the measures' "detailed operating provisions" and "how [they are] actually applied."¹³⁷ As a result, the chapeau requires a WTO member to provide evidence justifying any differential treatment of, and/or among, its trading partners.¹³⁸

Here it is important to note that "arbitrary and unjustifiable discrimination" as contemplated by the chapeau is analytically distinct from discrimination under the Most Favored Nation and National Treatment

131. *See Brazil-Tyres AB Report, supra* note 120, at ¶ 178.

132. Appellate Body Report, *United States—Import Prohibition of Certain Shrimp and Shrimp Products*, ¶ 171, WT/DS58/AB/R (Oct. 12, 1998) [hereinafter *US-Shrimp AB Report*].

133. *US-Gasoline AB Report, supra* note 122, at 21.

134. Sanford Gaines, *The WTO's Reading of the GATT Article XX Chapeau: a Disguised Restriction on Environmental Measures*, 22 U. PA. J. INT'L ECON. L. 739, 741 n.5 (2001).

135. PAUWELYN, *supra* note 124, at 37.

136. GATT, *supra* note 88, art. XX.

137. *US-Shrimp AB Report, supra* note 132, at ¶ 160.

138. *Brazil-Tyres AB Report, supra* note 127, at ¶ 225.

provisions of GATT.¹³⁹ In contrast to GATT Articles I and III, which require that a WTO member's measure have a uniform effect on all trading partners, an analysis of unjustifiable or arbitrary discrimination under the chapeau necessarily requires consideration of a measure's diverse effects on "countries where the same conditions prevail." As a result, measures promoting the use of CMTs will have a greater chance of surviving justification under the chapeau if they fairly and predictably make adjustments for countries with comparable climate policies and for countries at different stages of economic development.¹⁴⁰ Whether a WTO member has taken into account the special needs of its trading partners and can thereby justify such a measure under the chapeau will depend on whether: (1) its measure requires a foreign country to adopt its own policies; (2) it has attempted to engage in negotiations with its trading partners with a view to concluding bilateral or multilateral agreements; and (3) the implementation and administration of its measure respects basic fairness and due process.¹⁴¹

To date, chapeau justifications have not been very successful.¹⁴² For example, in *US-Gasoline*, the Appellate Body did not accept that a uniform pollutant baseline for importers and an individualized pollutant baseline for domestic refiners was justifiable on the grounds that administrative difficulty and domestic hardship required the differing treatment of domestic and foreign industry. Similarly, in *US-Shrimp*, the Appellate Body held that a requirement permitting the marketing of shrimp only if caught by a vessel equipped with a Turtle Excluder Device could not overcome the Article XX Chapeau for a number of reasons including: (i) differing technology phase-in periods, (ii) the rigidity and inflexibility of the measure which recognized only one way of avoiding turtle harm, (iii) and the lack of a transparent and predictable certification process under the measure.¹⁴³ More recently, in *Brazil-Retreaded Tyres*, the Appellate Body determined that while a Brazilian regulation banning the import of retreaded tires was necessary for the "reduction of the risks of waste tyre accumulation"¹⁴⁴ it was arbitrary and unjustified

139. See PAUWELYN, *supra* note 124, at 37–38 (offers an incisive explanation of the differences between discrimination in the chapeau and GATT Articles I (Most-Favoured-Nation) and III (National Treatment)).

140. JOOST PAUWELYN, CARBON LEAKAGE MEASURES AND BORDER TAX ADJUSTMENTS UNDER WTO LAW, *in* RESEARCH HANDBOOK ON ENVIRONMENT, HEALTH AND THE WTO 48–49 (C. Provost and G. Van Calster eds., 2012); EPPS & GREEN, *supra* note 4, at 77–78; HUFBAUER, *supra* note 3, at 48.

141. See PAUWELYN, *supra* note 124, at 38–41.

142. See, e.g., *US-Gasoline* AB Report, *supra* note 120, at ¶¶ 21–22, 26–29.

143. *US-Shrimp* AB Report, *supra* note 132, at ¶¶ 142, 174, 161–64, 178.

144. *Brazil-Tyres* AB Report, *supra* note 127, at ¶ 7.142.

because the measure contained an exception for imports from other MERCOSUR Member States.¹⁴⁵

IV. HOW INTERNATIONAL INVESTMENT LAW AND INTERNATIONAL TRADE LAW MAY PROMOTE CARBON MANAGEMENT TECHNOLOGIES

While international trade law and international investment law are most often viewed as posing barriers to the adoption of environmental measures, an important theme of this article is that international trade law and international investment law can also serve to promote or protect measures with environmental objectives such as the promotion of CMT.

A. Protection of Carbon Management Technologies Under International Investment Law

International investment law may help protect investors in CMT industries by guaranteeing a stable regulatory climate within which those investors operate. International investment law can reinforce the effectiveness of carbon management policies by forcing states to respect commitments that they made as part of persuading an investor to adopt an expensive technology such as CCS. As noted above, commitments might include a direct subsidy to these CMTs and/or a commitment to assume the long-term liability, an issue of particular importance for CCS. Budget pressures may tempt states to renege on promises of public support once the investments have been made and costs are "sunk."¹⁴⁶ Or a new government in office may seek to change the policies of a previous government, perhaps seeking to invest more in renewables and conservation at the expense of CCS. The long-term nature and political sensitivity of upstream energy investments means that they may be particularly vulnerable to regulatory and political risks. The disciplines or standards incorporated in IIAs offer investors some protection against these risks. The most important standards for present purposes are: the duty not to expropriate directly or indirectly except upon payment of compensation, the national treatment standard, the minimum standard of treatment or the fair and equitable treatment standard, the umbrella clause or the promise to fulfill commitments made to investors.

In each case, the investor will need to establish that it is an investor within the meaning of the relevant treaty who has made an invest-

145. *Id.* at ¶ 233.

146. See Dieter Helm et al., *Credible Carbon Policy*, 19 OXFORD REV. ECON. POL'Y 438, 439-42 (2003).

ment also within the meaning of the treaty.¹⁴⁷ However, the typical IIA defines investor and investment very broadly so that investors in CMTs in the energy sector are likely to fall within this definition.¹⁴⁸ The investment regime of the Energy Charter Treaty, while similarly broad,¹⁴⁹ is exceptional in that it is limited to “any investment associated with an “Economic Activity in the Energy Sector.”¹⁵⁰ However, CCS investments will likely fall within that scope. Indeed, the Energy Charter Secretariat considers that CCS is part of the “energy cycle.”¹⁵¹ Carbon dioxide capture, its transportation by pipelines, and its storage can, according to the Energy Charter Secretariat, be certified as being Economic Activities in the Energy Sector.¹⁵² More generally, the Secretariat argues that “[carbon dioxide] may be taken within the coverage of the term ‘energy related activity.’”¹⁵³

It seems unlikely that the withdrawal of a CMT subsidy or the refusal to honor a transfer of liability for carbon storage will violate the expropriation standard of IIAs. This is because arbitral awards have set the threshold for what counts as an expropriation at a very high level.¹⁵⁴

147. See Freya Baetens, *The Kyoto Protocol in Investor-State Arbitration: Reconciling Climate Change and Investment Protection Objectives*, in SUSTAINABLE DEVELOPMENT IN WORLD INVESTMENT LAW 681, 683, 693 (Marie-Claire Cordonier Segger et al. eds., 2011).

148. This will be the case even where the investor must also meet the requirements of Article XX of the Convention on the Settlement of Investment Disputes between States and National of Other States. See 575 U.N.T.S. 159, Oct. 14, 1966. See also *Fedax N.V. v. Republic of Venezuela*, ICSID Case No. ARB/96/3, Decision on Objections to Jurisdiction, ¶ 43 (Jul. 11, 1997); *Salini Costruttori S.P.A. v. Kingdom of Morocco*, ICSID Case No. ARB/00/4, Decision on Jurisdiction, ¶ 52 (Jul. 23, 2001) (creating the so called Salini test which requires contributions by the investor, certain duration of performance, the existence of operational risks, and the contribution to the economic development of the host state).

149. See Emmanuel Gaillard, *Investments and Investors Covered by the Energy Charter Treaty*, in INVESTMENT ARBITRATION AND THE ENERGY CHARTER TREATY 54, 58 (Clarisse Ribeiro ed., 2006) (“The . . . ECT has adopted a broad approach in identifying the types of investors and of investments that can benefit from its substantive protection.”).

150. ECT, *supra* note 49, art. 1(6), at 42.

151. See ENERGY CHARTER SECRETARIAT, INVESTMENT AND MARKET DEVELOPMENT IN CARBON CAPTURE AND STORAGE: ROLE OF THE ENERGY CHARTER TREATY 29 (2009), available at http://www.encharter.org/fileadmin/user_upload/Publications/CCS_2009_ENG.pdf.

152. *Id.* at 29.

153. *Id.* at 8.

154. Cf. *Nykomb Synergetics Technology Holding AB v. The Republic of Latvia*, Arbitral Award, at 33 (Arbitration Inst. of the Stockholm Chamber of Commerce, 2003), available at http://arbitrationlaw.com/files/free_pdfs/Nykomb%20v%20Latvia%20-%20Award.pdf (In this arbitral award dealing with the refusal of a government agency to continue paying a feed-in tariff, the arbitration panel rejected a claim of indirect, creeping or regulatory expropriation. The panel noted that the “[t]he decisive factor for drawing the border line towards expropriation must primarily be the degree of possession taking or control over the enterprise the disputed measures entail. In the present case, there is no possession tak-

Moreover, the withdrawal of a subsidy is unlikely to destroy the “entire” value of a CMT investment in the upstream energy sector.¹⁵⁵ Nor is the withdrawal of subsidies likely to be deemed a violation of the national treatment standard unless it targets foreign investors *ex facie* or as a matter of practice. A general refusal to observe commitments of support will not allow foreign investors to rely on the national treatment standard.¹⁵⁶

However, the fair and equitable treatment standard provides an absolute standard of investment protection, irrespective of the treatment accorded to other investors. Subsidies for CMT investments create incentives that aim to stimulate private investment in the deployment of carbon reduction technologies in the upstream energy sector. CCS investors, for instance, build their business cases on the basis of these subsidy promises. They invest in reliance upon the faithful implementation of support commitments made by host states. Absent a revenue stream from CCS or a sufficiently high carbon price, public support is a *conditio sine qua non* of CCS investments.¹⁵⁷ The fair and equitable treatment standard could therefore provide important guarantees of protection against a state renegeing on the arrangements it has made to attract CCS investments.¹⁵⁸

Another way in which international investment law may protect CMT project investment is through umbrella clauses. The umbrella clause of an IIA (if it has one) commits the host state to observe promises

ing of Windau or its assets, no interference with the shareholder’s rights or with the management’s control over and running of the enterprise – apart from ordinary regulatory provisions laid down in the production licence, the off-take agreement, etc.”).

155. For CCS projects, for instance, the operator will remain in control of the various facilities in the CCS chain from the point of capture to the point of injection. The capture facility whether a power plant or a bitumen upgrader will still provide some revenue.

156. See *LG&E Energy Corp., LG&E Capital Corp., and LG&E International Inc. v. Argentine Republic*, ICSID Case No. ARB/02/1, Decision on Liability, ¶ 147 (Oct. 3, 2006) [hereinafter *LG&E Energy Corp.*]; see also *Noble Ventures, Inc. v. Romania*, ICSID Case No. ARB/01/11, Award, ¶ 180 (Oct. 12, 2005) [hereinafter *Nobel Ventures*].

157. Michael Grubb et al., *A Low-Carbon Electricity Sector for the UK: Issues and Options*, in *DELIVERING A LOW-CARBON ELECTRICITY SYSTEM – TECHNOLOGIES, ECONOMICS AND POLICY* 278, 300 (Michael Grubb et al. eds., 2008) (According to Grubb, Jamasb, and Pollitt, “[p]ublic support for the . . . development and deployment of new technologies and industries to reduce emissions is vital.”); Letter from Ole Beier Srensen, Chairman, Institutional Investors Group on Climate Change, to D. José Luis Rodríguez Zapatero, Prime Minister of Spain, on the Proposed Retroactive Reduction of 661 Tariff for Existing Investments (Jun. 23, 2010), available at http://www.iigcc.org/_data/assets/pdf_file/0010/1009/IIGCC-letter-to-Spanish-government.pdf.

158. U.N. Conference on Trade and Development, *World Investment Report 2010: Investing in a Low-Carbon Economy*, 137, U.N. Doc. UNCTAD/WIR/2010 (2010).

made to an investor.¹⁵⁹ It serves to internationalize what might otherwise be a simple breach of contract, which must be litigated in the domestic courts of the host state.¹⁶⁰ The umbrella clause in the Energy Charter Treaty provides that “[e]ach Contracting Party shall observe any obligations it has entered into with an Investor or an Investment of an Investor of any other Contracting Party.”¹⁶¹ An umbrella clause only protects commitments made by the state or a state entity.

In the case of CCS there may be a number of direct contractual relations between the state and the operator of a CCS project. For example, if the target pore space is vested in the state (as it typically will be outside the United States), the legal arrangement under which an operator acquires the rights by licence or lease to use the pore space may be the source of obligations owed by the State to the investor.¹⁶² Similarly, if the state provides financial support to the CCS proponent, the legal arrangements for that commitment whether by contract or otherwise will likewise be protected.

It will not be possible to establish a breach of the umbrella clause in the situation where the “commitment” simply takes the form of the legislative scheme as it stands at the time of the investment. For example, if the legislation provides for the transfer of liability from the operator to the government after site closure and a period of stabilization the subsequent repeal of that legislation will not be a breach of an umbrella clause

159. See Anthony C. Sinclair, *The Origins of the Umbrella Clause in the International Law of Investment Protection*, 20 *ARB. INT'L* 411 (2004); see also OECD, *Interpretation of the Umbrella Clause in Investment Agreements*, No. 2006/3 (Oct., 2006), available at <http://www.oecd.org/dataoecd/3/20/37579220.pdf>; see also Thomas W. Wälde, *Contract Claims under the Energy Charter Treaty's Umbrella Clause: Original Intentions versus Emerging Jurisprudence*, in *INVESTMENT ARBITRATION AND THE ENERGY CHARTER TREATY* 205 (Clarisse Ribeiro ed., 2006) (for discussion of the history of the clause).

160. See Gabrielle Kaufmann-Kohler, *Introduction: Treaty versus Contract Claims*, in *INVESTMENT ARBITRATION AND THE ENERGY CHARTER TREATY* 201 (Clarisse Ribeiro ed., 2006).

161. ECT, *supra* note 49, art. 10, at 53; see also ECT *supra* note 49, annex IA, at 98 (Some states were permitted to make a reservation to the umbrella clause of Article 10. Four states did so of which three have never gone on to ratify the treaty – Norway, Canada and Australia.); see also *CMS Gas Transmission Company v. Argentine Republic*, ICSID Case No. ARB/01/8, Award (May 12, 2005); *CMS Gas Transmission Company v. Argentine Republic*, ICSID Case No. ARB/01/8, Decision of the Ad Hoc Committee on the Application for Annulment of the Argentine Republic, ¶ 89 (Sep. 25, 2007) [hereinafter *CMS Gas*] (the US\Argentina BIT at issue in a number of arbitrations including these two similarly provided that each Party “shall observe any obligations it may have entered into with regard to investments”).

162. See, e.g., *Mines and Minerals Act*, R.S.A. 2000, c M-17 (Can.).

absent some further facts that shows that the host state had “entered into” an “obligation” not to repeal the transfer of liability.¹⁶³

B. Promoting Carbon Management Technologies Under International Trade Law

In addition to international investment law, international trade law also has the overlooked potential to *support* the implementation of CMT-promoting policies. International trade law provides a framework for trade in goods that include CMTs, and CMT parts and components. To the extent that international trade in CMTs, CMT technologies, and CMT parts and components further the development of CMTs, the liberalization of trade in these areas is a boon to CMTs. Recent trade negotiations have included attempts to reduce tariff rates on environmental goods. For example, the WTO supports negotiations aimed at reducing or eliminating tariff and non-tariff barriers to environmental goods and services.¹⁶⁴ Certain regional or bilateral initiatives, such as the Canada-Costa Rica Free Trade Agreement, eliminate tariffs on environmental goods.¹⁶⁵ The recent Asia-Pacific Economic Cooperation leaders’ meeting outlined an environmental goods list for liberalization as part of the participants’ move to meet green goals.¹⁶⁶

International trade negotiations under the Trans-Pacific Partnership (TPP) also provide a potential mechanism to support CMT-promoting technologies. With Canada’s entry into the TPP, most of the key economies in the Pacific region are now participants,¹⁶⁷ and a critical mass now exists for consideration of global climate issues in the TPP negotiations. Because the TPP negotiations have not been transparent, it

163. CMS Gas, *supra* note 161, at ¶ 89 (the Ad Hoc Committee observed that the word “obligations” must mean legal obligations and that “[a]lthough legitimate expectations might arise by reason of a course of dealing between the investor and the host State, these are not, as such, legal obligations, though they may be relevant to the application of the fair and equitable treatment clause contained in the BIT.”).

164. World Trade Org., Ministerial Declaration of 14 November 2001, WT/MIN(01)/DEC/1, ¶31(iii), available at http://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm.

165. Nimubona, *supra* note 40, at 324.

166. APEC Leaders Clinch Environmental Goods List, 12 BRIDGES TRADE BIORES no. 15 (Sept. 13, 2012), http://ictsd.org/i/news/biores/144620/?utm_content=ndbankes%40ucalgary.ca&utm_source=VerticalResponse&utm_medium=Email&utm_term=APEC%20Leaders%20Clinch%20Environmental%20Goods%20List&utm_campaign=News%20Digest%20%7c%20Canada%20Announces%20About%20Face%20on%20Controversial%20Asbestos%20Stancecontent (last visited May 3, 2013).

167. *Trans-Pacific partners invite Canada to the table: Canada to join trade talks with Asia-Pacific nations*, CBC NEWS (June 19, 2012), <http://www.cbc.ca/news/world/story/2012/06/19/pol-g20-harper-obama-tpp-mexico.html> (last visited May 3, 2013).

is not known what, if anything, the governments have discussed regarding trade and climate change. Climate policy is too important to be left out, however. TPP will likely provide opportunities to form partnerships among governments, business, and NGOs in the trans-Pacific region. This is particularly important for CMTs, as these types of partnerships may provide the needed scale for CMTs to fully develop.

Also presenting an opportunity to promote CMTs under international trade law is potential amendment of the ASCM to revive an exemption for “non-actionable” subsidies. As discussed in Section III above, the ASCM constrains CMT-promoting policies by prohibiting certain subsidies or making them actionable. Under Article 2, “non-specific” subsidies are non-actionable, the only remaining category of non-actionable subsidies in the ASCM.¹⁶⁸ Before 1999, however, the ASCM recognized other non-actionable subsidies,¹⁶⁹ including subsidies pertaining to research and development¹⁷⁰ and the costs of environmental regulation.¹⁷¹ Since the expiration of those provisions, the policy space afforded

168. ASCM, *supra* note 58, at art. 2, 8.1.

169. *Id.* at arts. 8–9 (which have been unenforceable since 1999 when countries could not reach a consensus on their extension).

170. *Id.* at art. 8(2)(a) (footnotes omitted) states: 8(2) Notwithstanding the provisions of Parts III and V, the following subsidies shall be non-actionable:

(a) assistance for research activities conducted by firms or by higher education or research establishments on a contract basis with firms if: the assistance covers not more than 75 percent of the costs of industrial research or 50 percent of the costs of pre-competitive development activity; and provided that such assistance is limited exclusively to:

- (i) costs of personnel (researchers, technicians and other supporting staff employed exclusively in the research activity);
- (ii) costs of instruments, equipment, land and buildings used exclusively and permanently (except when disposed of on a commercial basis) for the research activity;
- (iii) costs of consultancy and equivalent services used exclusively for the research activity, including bought-in research, technical knowledge, patents, etc.;
- (iv) additional overhead costs incurred directly as a result of the research activity; other running costs (such as those of materials, supplies and the like), incurred directly as a result of the research activity.

171. *Id.* at art. 8(2)(c) (footnotes omitted) reads as follows:

8(2) Notwithstanding the provisions of Parts III and V, the following subsidies shall be non-actionable:

....

(c) assistance to promote adaptation of existing facilities to new environmental requirements imposed by law and/or regulations which result in greater constraints and financial burden on firms, provided that the assistance:

- (i) is a one-time non-recurring measure; and
- (ii) is limited to 20 per cent of the cost of adaptation; and

governments to support research and development geared toward the creation of CMTs or to support the adaptation of facilities using CMTs has diminished. As a result, WTO governments might consider re-enacting, or perhaps revising those provisions within the ASCM.¹⁷²

C. Carbon Pricing and Border Tax Adjustments

As noted above, carbon pricing is a central policy to the promotion of CMT, but is so thoroughly treated elsewhere, that this article will not discuss it in detail. To highlight how international trade law may aid in the development and continuing viability of CMTs, we briefly mention a way in which international trade law may provide a crucial support for carbon pricing.

Unilateral carbon pricing proposals invariably give rise to concerns about impacts of industries in a carbon pricing jurisdiction, vis-à-vis industries in jurisdictions that do not price carbon.¹⁷³ In order to address the issues of competitiveness losses and emissions leakage that could result from a unilateral carbon pricing, analysts and policy makers

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- (iii) does not cover the cost of replacing and operating the assisted investment, which must be fully borne by firms; and
 - (iv) is directly linked to and proportionate to a firm's planned reduction of nuisances and pollution, and does not cover any manufacturing cost savings which may be achieved; and
 - (v) is available to all firms which can adopt the new equipment and/or production processes.

172. For a discussion of the advantages and disadvantages associated with resurrecting the non-actionable subsidy provisions in the ASCM, see Rubini, *supra* note 76, at 525–79 (arguing that what is needed in the ASCM is new rules that would expressly permit subsidies for renewable energy), and Bigdeli, *supra* note 75, at 2–36 (concluding that reviving and expanding upon the non-actionable subsidies provisions in the ASCM should be coupled with procedural improvements regarding transparency, proportionality and abuse prevention as a way of monitoring government subsidization measures). See also Robert Howse, *Climate Mitigation Subsidies and the WTO Legal Framework: A Policy Analysis*, INT'L INST. FOR SUSTAINABLE DEV., at 1–25 (May 2010), available at <http://www.iisd.org/publications/pub.aspx?id=1275> (suggesting that a reconceptualization of non-actionable subsidies based on the range of policies listed in the Kyoto Protocol as appropriate policies for the implementation of Kyoto commitments).

173. See M. Scott Taylor, *Unbundling the Pollution Haven Hypothesis*, 4 BE J. ECONOMIC ANALYSIS & POL'Y 3 (2005) (the notion that emissions intensive industries will move to less stringently regulated countries as a result of environmental policy is known as the "pollution haven hypothesis," and has been tested using theoretical and empirical models. A related concern is emissions leakage: if pollution intensive activities simply shift from one jurisdiction to another as a result of a carbon price, then (for a global pollutant like CO₂) there may be no net environmental improvement as a result of the policy).

have proposed the imposition of border tax adjustments.¹⁷⁴ A border tax adjustment is a duty levied by a country adopting some carbon pricing scheme, on a country that does not have a carbon pricing scheme, the purpose being to equalize the regulatory cost burden among trading partners. Alternatively, a border tax adjustment can take the form of a subsidy for a good exported from a country adopting carbon pricing to one that does not.

These measures have proved controversial because they could be used to protect domestic industries, an effect that is prohibited under international trade law.¹⁷⁵ However, it is possible that a border tax adjustment would *not* run afoul of international trade rules, and would in fact be a vital mechanism for a country considering a carbon tax but wary of the competitiveness implications for its domestic industries. The implications of carbon pricing and border carbon adjustments have been discussed at length by others¹⁷⁶ and are not discussed at length here, except to point out that this aspect of trade law may support carbon pricing after all. Thus, a country promoting CCS would be well-advised to complement CCS-promoting policies with carbon pricing to provide some price stability and long-term economic viability for CCS projects. If so, a border tax adjustment that is consistent with trade rules could prevent the leakage feared to take place when a country unilaterally adopts carbon pricing.

V. CONCLUSION

Imposing a uniformly applicable carbon price across all emitters is a first-best and fundamental climate policy. However, not only does car-

174. See, e.g., American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009) (died, passed House) (the proposed US climate bill included provisions supporting the eventual implementation of border tax adjustments).

175. CCS INDUSTRY ROADMAP, *supra* note 9, at 33–4; *A Policy Strategy for Carbon Capture and Storage: Information Paper*, INT’L ENERGY AGENCY 8 (Jan. 2012); *Report of the Interagency Task Force on Carbon Capture and Storage*, U.S. DEPT. OF ENERGY 94, 98 (Aug. 2010), available at <http://www.fe.doe.gov/programs/sequestration/ccstf/CCSTaskForceReport2010.pdf>.

176. See generally EPFS & GREEN, *supra* note 4, at 122–41; HUFBAUER, *supra* note 3, at 66–70; Cosbey ed., *supra* note 77, at 19–38; Yazid Dissou & Terry Eyland, *Carbon Control Policies, Competitiveness, and Border Tax Adjustments*, 33 ENERGY ECON. 556, 556–57 (2011); Carolyn Fischer & Alan K. Fox, *The Role of Trade and Competitiveness Measures in US Climate Policy*, 101 AM. ECON. REV. 258, 259, 261 (2011); Peter Holmes et al., *Border carbon adjustments and the potential for protectionism*, 11 CLIMATE POL’Y 883, 884 (2011); Christine Kaufmann & Rolf H. Weber, *Carbon-related border tax adjustment: mitigating climate change or restricting international trade?*, 10 WORLD TRADE REV. 497, 498 (2011); Ben Lockwood & John Whalley, *Carbon-motivated Border Tax Adjustments: Old Wine in Green Bottles?*, 33 WORLD ECON. 810, 811 (2010); John Whalley, *What Role for Trade in a Post-2012 Global Climate Policy Regime*, 34 WORLD ECON. 1844, 1850–51 (2011).

bon pricing seem politically challenging, but even if a carbon price is adopted, CMTs will likely require policies in addition to carbon pricing to support development. The strategic, political, and economic importance of CMTs calls for an analysis of potential policy levers to promote CMTs, and a considered discussion of the international trade and investment law implications of these policy levers. The focus in this article has been on CMTs in the upstream energy production sectors, though the analysis in this article has wide application across a number of different emitting industries and countries.

International trade and international investment law can constrain a variety of environmental measures, including CMT-promoting policies. This is unsurprising, given the long-standing tension between environmental concerns and trade concerns. However, it is possible to overstate this tension, and overlook opportunities to invoke international trade or international investment law to *advance* or protect CMT-promoting policies. The view that international trade and international investment law is unambiguously constraining green policy space is thus simplistic and misleading. A number of tools and possible tools that draw on international trade law or international investment law may be used to promote CMTs, or advance CMT-promoting policies. International trade law and international investment law have always tolerated well-drafted environmental measures, and supporting CMTs with well-drafted legislation and regulation should similarly avoid running afoul of international trade or international investment law.