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Coase and the Control of Transboundary Pollution: The Sale of Hydroelectricity Under the United States-Canada Free Trade Agreement of 1988

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*Barbara K. Bucholtz**

I. INTRODUCTION

Free trade agreements sometimes can act as surrogates for traditional international regulation. Recently scientific understanding and public awareness of transboundary pollution have provided the impetus for multilateral agreements designed to curtail transboundary pollution. Among the major air pollution agreements are the Convention on Long-Range Transboundary Air Pollution, the Sulphur Emissions Protocol, the Nitrogen Oxides Emissions Protocol, the Vienna Convention for the Protection of the Ozone Layer, and the Montreal Protocol.[1] These agreements represent an

* University Fellow of Law and LL.M., Environmental Law, George Washington University, The National Law Center. The author would like to thank Professor Lynn A. Stout, Georgetown University Law Center, and Professor Arnold W. Reitze, Jr., Director of Environmental Law, George Washington University, for their comments on drafts of this Article.

[1] The precursor of these agreements was the Stockholm Declaration of 1972, Declaration of the United Nations Conference on the Human Environment, *adopted* June 16, 1972, U.N. Doc. A/Conf.48/14 (1972), *reprinted in* 11 I.L.M. 1416 (1972) [hereinafter Stockholm Declaration]. The Stockholm Declaration evinced a concerted effort to develop international fora and mechanisms for the regulation of transboundary pollution. Subsequently, several accords have been reached. In the arena of transboundary *air* pollution, the major agreements are: the Nitrogen Oxides Emissions Protocol of 1988, Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes, *done* Nov. 1, 1988, *reprinted in* 28 I.L.M. 212 (1989) [hereinafter Nitrogen Oxides Emission Protocol]; the Montreal Protocol on Substances that Deplete the Ozone Layer, *opened for signature* Sept. 16, 1987, *reprinted in* 26 I.L.M. 1541 (1987) [hereinafter Montreal Protocol]; the Sulfur Emissions Protocol of 1985, Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution on the Reduction of Sulfur Emissions or Their Transboundary Fluxes by at Least 30 Percent, *done* July 9, 1985, *reprinted in Report of the Third Session of the Executive Body of the Convention on Long-Range Transboundary Air Pollution*, U.N. Doc. ECE/EB.AIR/7, annex 1; the Vienna Convention for the Protection

"internationalization"[2] of environmental regulation modeled after conventional international accords.[3] Because the parties to international accords are sovereign states, each party must generate sufficient domestic political support to enact an international regulatory accord. As Robert Hahn and Kenneth Richards have stated, "[D]omestic politics plays a substantial, and perhaps dominant, role" in the forming of international environmental agreements.[4] Domestic politics, then, is pivotal in achieving multilateral accord.

What happens when the specter of domestic politics acts as a barrier to multilateral accord on regulation of a serious transboundary pollution problem? Are there no alternatives to the format of traditional international law? This Article proposes that, in the absence of requisite domestic political consensus, market forces—through the auspices of free trade agreements—may be employed as a substitute for traditional international regulation. This Article proposes that Hardin's "commons" may occasionally be saved from "tragedy"[5] by applying a variant of Coase's theorem:[6] in the absence of "hard Law,"[7] the bargaining of private parties in free trade arenas may result in a curtailment of transboundary pollution.

The Montreal Protocol,[8] for example, is widely acclaimed as a prototypical mechanism for the regulation of transboundary pollution.[9] As will be discussed subsequently, however,[10] fortuitous cir-

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of the Ozone Layer, *opened for signature* Mar. 22, 1985, U.N. Doc. UNEP/IG.53/5/Rev.1, *reprinted in* 26 I.L.M. 1529 (1987) [hereinafter Vienna Convention]; Convention on Long-Range Transboundary Air Pollution, Nov. 13, 1979, T.I.A.S. No. 10,541, *reprinted in* 18 I.L.M. 1442 (1979). For a more complete discussion of the evolution of international environmental law, see Lang, *Environmental Protection: The Challenge for International Law*, 20 J. WORLD TRADE L. 489 (1986).

[2] Hahn & Richards, *The Internationalization of Environmental Regulation*, 30 HARV. INT'L L.J. 421, 423 (1989).

[3] *See id.* at 423–24.

[4] *Id.* at 422.

[5] *See* Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968). *See infra* notes 172–81 and accompanying text.

[6] *See generally* Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). Coase argued that governmental regulation is not necessarily the most efficacious social mechanism for dealing with the harmful effects of industries. *See infra* notes 185–86 and accompanying text.

[7] "Hard law" refers to international agreements—for example, treaties, conventions, or protocols that pertain to the regulation of a specific pollutant or environmental problem—in contrast to "soft law," which sets forth guidelines on more general subjects of environmental concern. *See* Lang, *supra* note 1, at 495.

[8] Montreal Protocol, *supra* note 1.

[9] *See, e.g.*, Mintz, *Keeping Pandora's Box Shut: A Critical Assessment of the Montreal Protocol on Substances that Deplete the Ozone Layer*, 20 U. MIAMI INTER-AM. L. REV. 565, 577 (1989).

[10] *See infra* notes 42–49 and accompanying text.

cumstances surrounded its formation, thus generating the domestic consensus required for its ratification. Its applicability to other transboundary pollution problems, therefore, will be limited to those situations in which a similar political consensus is available.

The United States-Canada Free Trade Agreement (FTA),[11] by contrast, assiduously avoided the issue of transboundary acid rain in spite of the fact that the issue was a vital component of the negotiations preceding ratification of the Agreement.[12] Nevertheless, by providing a free trade arena for the sale of Canadian hydroelectricity to United States markets, the FTA will act as a catalyst for acceleration of these sales. To the extent that Canadian hydroelectricity displaces existing United States energy-producing facilities that are major contributors to acid rain, the FTA will ameliorate the transboundary acid rain problem.[13] Thus, a free trade agreement can be an important mechanism for encouraging environmentally benign behavior through the auspices of the marketplace, where political forces make a hard law regulatory approach infeasible.

Part II of this Article reviews the ozone depletion problem and the provisions of the Montreal Protocol that attempt to curtail it. Part II also identifies the forces that impelled ratification of the Protocol, and concludes with an assessment of the Protocol's general applicability to other transboundary pollution problems. Part II contains some background materials on the transboundary acid rain problem between the United States and Canada. It also discusses the development of the FTA against the backdrop of domestic politics. Part III assesses the impact of the sale of Canadian hydroelectricity to United States markets under the FTA. Part IV concludes with a discussion of free trade agreements as vehicles for transboundary pollution abatement.

II. Ozone Depletion and the Montreal Protocol

A. The Problem: Ozone Depletion

The effects of various pollutants on the ozone layer are now well-documented.[14] The scientific findings relative to these effects may

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[11] The United States-Canada Free Trade Agreement Implementation Act of 1988 [hereinafter FTA] can be found at Pub. L. No. 100-449, 102 Stat. 1851 (1988).

[12] *See, e.g.*, Carson, *Environmental Protection, Unfair Competition and the U.S.-Canada Free Trade Discussions*, 12 Canada-U.S. L.J. 263, 263–64 (1987).

[13] *See infra* notes 125–39 and accompanying text.

[14] The ozone layer is a 20-mile veil of gas in the stratosphere that shields the earth from

be described briefly as follows. Ozone (O_3) is an unstable form of oxygen. It contains three oxygen atoms, while ordinary oxygen contains two.[15] Ozone is created in the upper atmosphere when sunlight acts on oxygen (O_2) molecules, and, in a balanced process, ozone is simultaneously destroyed when certain naturally occurring chemicals in the upper atmosphere (for example, nitrogen oxides) react with it and return it to O_2.[16] Scientists now understand that this dynamic balance has been upset as man-made chemicals, or chemicals released by industrial processes and products, have tipped the balance in favor of destruction of ozone.[17] Of the man-made chemicals that contribute to this destructive process, chlorofluorocarbons (CFCs)[18] and halons[19] appear to be the most significant.[20] CFCs are particularly pernicious because they are chemically inert and can remain in the atmosphere for over one hundred years, continuing to act upon ozone.[21] In fact, it is the characteristic chemical stability of CFCs that has made them so attractive for industrial processes and commercial products.[22]

When CFCs and halons are released to the upper atmosphere, they act to destroy the ozone layer in the strato-

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solar ultraviolet radiation. *See, e.g., Ozone Layer Depletions: Hearing before the Subcomm. on Health and the Environment of the House Comm. on Energy and Commerce*, 100th Cong., 1st Sess. 2 (1987).

[15] For the original scientific analysis of the ozone problem, see Molina & Rowland, *Stratospheric Sink for Chlorofluoromethanes: Chlorine Atom-Catalyzed Destruction of Ozone*, 249 NATURE 810, 810–12 (1974); *see also* R. WHITTEN & S. PRASAD, OZONE IN THE FREE ATMOSPHERE (1985).

[16] *See* Andreae, *The Oceans as a Source of Biogenic Gases*, OCEANUS, Winter 1986/87, at 27, 30.

[17] *See, e.g.*, Taubes & Chen, *Made in the Shade? No Way*, DISCOVER, Aug. 1987, at 62, 64.

[18] Stolarski, *The Antarctic Ozone Hole*, SCI. AM., Jan. 1988, at 30, 32–35.

[19] *See* Award Paper, *International Cooperation in Protection of Atmospheric Ozone: The Montreal Protocol on Substances that Deplete the Ozone Layer*, 16 DEN. J. INT'L L. & POL'Y 413, 415 n.15 (1988).

[20] Other gases that contribute to ozone depletion are nitrogen oxides (NO_x), nitrous oxide (N_2O), methane (CH_4), and carbon dioxide (CO_2). *Id.* at 414–15. However, annex A to the Montreal Protocol covers only CFCs and halons because of their disproportionate impact on ozone. *See* Montreal Protocol, *supra* note 1, at annex A, *reprinted in* 26 I.L.M. at 1561.

[21] Titus & Sidel, *Overview of the Effects of Changing the Atmosphere*, in EFFECTS OF CHANGES IN STRATOSPHERIC OZONE AND GLOBAL CLIMATE 4 (J. Titus ed. 1986). *See also* ENVIRONMENTAL STUDIES BOARD OF THE NATIONAL RESEARCH COUNCIL, CAUSES AND EFFECTS OF CHANGES IN STRATOSPHERIC OZONE: UPDATE 1983 (1984), *cited in* Award Paper, *supra* note 19, at 414 n.3.

[22] Taubes & Chen, *supra* note 17, at 64. CFCs are used in refrigeration and air-conditioning systems, as propellants in aerosol spray cans, as agents in the manufacture of synthetic foam, and as cleaning and sterilizing agents for equipment components. *See* Barnett, *Ozone Protection: The Need for a Global Solution*, ENVTL. PROTECTION AGENCY J., Dec. 1986, at 10. Halons are employed in fire extinguishers. *Id.*

sphere.[23] The ozone layer shields the earth from solar ultraviolet radiation by absorbing it.[24] This absorption is of critical importance in relation to one form of ultraviolet radiation, UV-B, because of its deleterious effects on the earth's surface.[25] When UV-B penetrates the stratosphere, it poses significant threats to human health.[26] It also affects flora, fauna, and ecosystems.[27] The scientific investigation that established these findings was precipitated by the study of M.J. Molina and F.S. Rowland, which initially asserted the cause-and-effect relationship between CFCs and ozone depletion.[28]

From 1974 to 1985, as scientific evidence mounted, it generated the public concern and political support required to achieve some sort of international accord. The result was the framework agreement known as the Vienna Convention for the Protection of the Ozone Layer,[29] which was prepared for signature in March 1985.[30] The Vienna Convention recognized a duty on the part of signatories to protect human health and the environment from ozone-depleting substances;[31] it promoted cooperation among signatories in scientific research on the ozone depletion problem;[32] it established a procedural and administrative framework both for the Convention's

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[23] *See* Award Paper, *supra* note 19, at 414–15.

[24] Bruce, *Man's Impact on Earth's Atmosphere*, in EFFECT OF CHANGES IN STRATOSPHERIC OZONE AND GLOBAL CLIMATE 41 (J. Titus ed. 1986), *cited in* Award Paper, *supra* note 19, at 414 n.6.

[25] Rowland, *A Threat to Earth's Protective Shield*, ENVTL. PROTECTION AGENCY J., Dec. 1986, at 4.

[26] For an analysis of UV-B's impact on the human immune system and the link between exposure to UV-B and increasing incidents of human cancer, see J. ARBUCKLE, N. BRYSON, D. CASE, C. CHERNEY, R. HALL, JR., J. MARTON, J. MILLER, M. MILLER, W. PEDERSON, JR., R. RANDLE, R. STOLL, T. SULLIVAN & T. VANDERVER, JR., ENVIRONMENTAL LAW HANDBOOK (9th ed. 1987).

[27] For example, scientists predict a significant increase in plant mutations due to UV-B radiation, and studies have shown that UV-B radiation diminishes production of phytoplankton, a vital link in the aquatic food chain. UV-B also reduces the reproduction of higher forms of aquatic life. Comment, *The Montreal Protocol: Confronting the Threat to Earth's Ozone Layer*, 63 WASH. L. REV. 997, 998 (1988).

[28] Molina & Rowland, *supra* note 15, at 810.

[29] Vienna Convention, *supra* note 1, *reprinted in* 26 I.L.M. at 1529. The Convention went into effect on September 22, 1988, when it had been signed by the requisite 20 nations. *European Community Ratifies Vienna Accord, Says It Will Act on Ozone Protocol Very Soon*, 11 Int'l Env't Rep. (BNA) 584 (Nov. 9, 1988). For a complete discussion of the procedural steps leading to ratification of the Vienna Convention, see Kindt & Menefee, *The Vexing Problem of Ozone Depletion in International Environmental Law and Policy*, 24 TAX INT'L L.J. 261, 270–77 (1989).

[30] Vienna Convention, *supra* note 1, *reprinted in* 26 I.L.M. at 1540. The United States ratified the Convention on August 29, 1986. *Treaties*, DEP'T ST. BULL., Nov. 1986, at 88.

[31] Vienna Convention, *supra* note 1, *reprinted in* 26 I.L.M. at 1529–30.

[32] *Id.*, *reprinted in* 26 I.L.M. at 1530–31.

implementation[33] and for dispute resolution concerning its interpretation.[34] Due to nationalistic and interest group factionalism, however, sufficient political support for establishing a regulatory regime was not garnered.

Because the factionalism that emerged during negotiations on the Vienna Convention are endemic to the struggle to achieve multilateral agreement on environmental problems, it may be instructive to identify the major protagonists. First, because of the rapidly emerging scientific discoveries during the negotiation period, there was some confusion within the scientific community regarding the problem. As Dr. Mostofa K. Tolba, Executive Director of the United Nations Environment Programme (UNEP), stated, the "understanding of the problem . . . changed rapidly, even from one working group meeting to the next. Not everyone [could] agree on one single theory."[35] Second, the division among the parties to the Convention reflected their various nationalistic and economic interests. The developed nations tended to support a more active approach to a regulatory regime than the underdeveloped nations, whose primary agenda was to achieve economic and industrial parity with the industrial nations, even at the expense of the environment.[36] Similarly, on the issue of a regulatory regime, the industrialized nations were polarized between the European Common Market countries, which advocated a production capacity ceiling on CFCs and halons,[37] and the "Toronto Group,"[38] which supported "an 80 percent reduction or complete ban" on "nonessential uses" of aerosols.[39] Third, there was the ubiquitous split between environmentalists, who favored the most stringent controls, and industry, which favored a wait-and-see approach.[40] Thus, while the Convention established a framework for

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[33] *Id.*, *reprinted in* 26 I.L.M. at 1531–32.

[34] *Id.*, *reprinted in* 26 I.L.M. at 1533–34.

[35] Sand, *Protecting the Ozone Layer: The Vienna Convention is Adopted*, ENV'T, June 1985, at 19, 20.

[36] Doolittle, *Underestimating Ozone Depletion: The Meandering Road to the Montreal Protocol and Beyond*, 16 ECOLOGY L.Q. 407, 419 (1989) (citing ENVIRONMENTAL PROJECT ON CENTRAL AMERICA (EPOCA), EARTH ISLAND INSTITUTE, CENTRAL AMERICA: ROOTS OF ENVIRONMENTAL DESTRUCTION (EPOCA/Green Paper No. 2, 1986)).

[37] Sand, *supra* note 35, at 41. Because the production of these European Economic Community (EEC) countries was below the proposed ceiling, this regulatory scheme would not affect them. Kindt & Menefee, *supra* note 29, at 276.

[38] The Toronto Group consisted of Canada, Finland, Norway, Sweden, and the United States. Sand, *supra* note 35, at 41.

[39] *Id.*

[40] *See generally* Taubes & Chen, *supra* note 17. In the debate over regulation of aerosols, industry argued that in the absence of "indisputable" scientific evidence of "immediate" danger,

addressing the ozone depletion problem, all efforts to establish a regulatory regime were undercut by the nationalist and interest group politics[41] represented by the factions described above. Subsequent developments in the next few years, however, engendered a critical mass of political support for international regulation of ozone-depleting agents.

Shortly after the Vienna Convention was prepared for signature, British scientists reported finding a seasonal, but significant, diminution of the ozone layer over the Antarctic.[42] These findings, widely publicized as the "ozone hole" phenomenon, created significant public alarm. The findings also inspired renewed efforts to achieve international agreement on regulation of the ozone problem.[43] These efforts culminated in the system of controls established by the Montreal Protocol.[44] The efforts, which eventually overcame the resistance of domestic politics, were sparked by the British report of the Antarctic "ozone hole" and fueled by prior reports of the crucial role that the ozone layer plays in protecting the earth's well-being.[45] In addition, conclusive evidence of the "ozone hole," taken in conjunction with reports that whatever damage had been done to the ozone layer might be irreversible and might also increase exponentially,[46] lent an apocalyptic hue to the ozone depletion problem. Finally, during this pivotal period between the formation of the

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regulatory control would be "precipitous." *Id.* at 65. Industry proferred this same argument in the debate over acid rain. *Id.*

[41] See Hahn & Richards, *supra* note 2 and accompanying text.

[42] Taubes & Chen, *supra* note 17, at 62; Stolarski, *The Antarctic Ozone Hole*, SCI. AM., Jan. 1988, at 30. A NASA Satellite report confirmed the finding three months later. Taubes & Chen, *supra* note 17, at 63. Nevertheless, scientists still were unable to agree upon a single theory concerning the phenomenon, which has subsequently been confirmed. One group of scientists, known as "dynamists," considered the "hole" to be the result of naturally occurring variations in the atmosphere. *Id.* at 68. The other scientific group, made up of chemists, believed that chemicals were the cause of the phenomenon. *Id.* The latter group's theory was vindicated by subsequent scientific investigations on the part of a scientific undertaking known as the National Ozone Expedition (NOZE), co-sponsored by three United States federal agencies. NOZE found that, while dynamic fluctuations were clearly involved, chemical assault on the ozone layer was the principal cause of ozone depletion. *Id.* at 69–70.

[43] In 1986, after NASA confirmed the British report, *id.* at 63, workshops sponsored by the United Nations Environment Programme (UNEP) under the auspices of the Vienna Convention began to hammer out proposed mechanisms for the control of CFCs and halons. Award Paper, *supra* note 19, at 417.

[44] Montreal Protocol, *supra* note 1, *reprinted in* 26 I.L.M. at 1541.

[45] *See supra* notes 14–28 and accompanying text.

[46] Benedick, *Protecting the Ozone Layer*, DEP'T ST. BULL., Apr. 1985, at 63. Additionally, in 1988, alarming news that the ozone layer over the United States, Canada, Western Europe, the U.S.S.R., China, and Japan was thinning at a rapid rate reached the public. Comment, *supra* note 27, at 998.

Vienna Convention and the Montreal Protocol, industry began to back away from its "no immediate danger" position and to intimate that substitutes for CFCs might be forthcoming.[47]

The importance of the availability of an environmentally "safe"[48] alternative to products that generate pollution should not be minimized. It is not too much to say that, where the benefits of a pollutant can be achieved by a more environmentally benign substitute without serious disruption of the consumption and lifestyle patterns of societies, the availability of that substitute will play a significant role in generating the political support that is crucial to agreement on pollution abatement regulation. To put it bluntly, the public will be more amenable to environmental regulation that does not restrict the availability of modern amenities.

In the arena of global ozone depletion, the factors identified above were sufficient to overcome the factionalism that blocked efforts to control ozone-depleting substances. As a result, a regulatory regime was established under the auspices of the Montreal Protocol.[49]

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[47] The Association for a Responsible CFC Policy, which represents E.I. Du Pont de Nemours & Co. and other CFC producers, launched a concerted effort to create CFC substitutes. Doolittle, *supra* note 36, at 413. The Association, however, also maintained a public stance opposing international regulation of CFCs. *Id.* By 1988, companies within the industry reported that safe substitutes were available. *Id.* at 414. In 1989, Du Pont, which is the largest producer of CFCs in the United States, announced that it had patented a CFC substitute for use in various cooling units, including refrigerators and air conditioners, and that the company would completely phase out its production of CFCs by the end of the decade. *Du Pont Creates Replacement for Ozone-Depleting Chemical*, Wash. Post, Jan. 31, 1989, at A6, col. 1. Most recently, Du Pont announced that its "world-wide" production of CFC substitutes would begin between 1992 and 1995. Hamilton, *Du Pont Plans to Invest in Phase-Out of CFCs*, Wash. Post, June 22, 1990, at F1, col. 5.

[48] In the case of CFCs, the "safe" substitutes are less stable than CFCs and therefore break down more rapidly. They also contain no chlorine, the agent in CFCs that attacks the ozone. For a discussion of the substitutes, see Doolittle, *supra* note 36, at 414–15.

[49] The Montreal Protocol was opened for signature on Sept. 16, 1987. Montreal Protocol, *supra* note 1, *reprinted in* 26 I.L.M. at 1550. The signatories were Belgium, Canada, Denmark, Egypt, Federal Republic of Germany, Finland, France, Ghana, Italy, Japan, Kenya, Mexico, the Netherlands, New Zealand, Norway, Panama, Portugal, Senegal, Sweden, Switzerland, Togo, United Kingdom, United States, Venezuela, and the EEC. UNITED NATIONS MULTILATERAL TREATIES DEPOSITED WITH THE SECRETARY-GENERAL: STATUS AS AT 31 DECEMBER 1987, at 802, U.N. Doc. St/Leg/Ser.E/6, U.N. Sales No. E.88.V.3 (1988). Subsequently, the following nations became signatories: Argentina, Australia, Austria, Burkina, Byelorussian S.S.R., Chile, Congo, Greece, Indonesia, Ireland, Israel, Luxembourg, Maldives, Malta, Morocco, Philippines, Spain, Thailand, Uganda, Ukrainian S.S.R., U.S.S.R. *Treaties*, DEP'T ST. BULL., Apr. 1988, at 87; *Treaties*, DEP'T ST. BULL., June 1988, at 68; *Treaties*, DEP'T ST. BULL., Aug. 1988, at 92; *Treaties*, DEP'T ST. BULL., Sept. 1988, at 83; *Treaties*, DEP'T ST. BULL., Oct. 1988, at 84; *Treaties*, DEP'T ST. BULL., Feb. 1989, at 74.

On April 21, 1988, the United States ratified the Montreal Protocol. *Treaties*, DEP'T ST. BULL., June 1988, at 68. The Montreal Protocol entered into force on January 1, 1989, when 11 parties had ratified it.

B. Montreal Protocol: An Assessment

Four principle components comprise the Montreal Protocol's regulatory scheme. First, it contains a freeze and reduction schedule for CFCs and halons.[50] Second, it provides certain incentives for developing countries to participate.[51] Third, it imposes restrictions on non-party trade in ozone-depleting substances.[52] Fourth, it calls for ongoing reassessment of the scientific, technological, and economic data on ozone depletion with a view to providing for periodic revisions of the reduction requirements.[53]

These regulatory provisions of the Montreal Protocol[54] represent an appreciable leap forward in the evolution of international envi-

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[50] Montreal Protocol, *supra* note 1, art. 2, *reprinted in* 26 I.L.M. at 1552–54.

[51] *Id.* art. 5, *reprinted in* 26 I.L.M. at 1555–56; *id.* art. 9, *reprinted in* 26 I.L.M. at 1556; *id.* art. 10, *reprinted in* 26 I.L.M. at 1557.

[52] *Id.* art. 4, *reprinted in* 26 I.L.M. at 1554–55.

[53] *Id.* art. 6, *reprinted in* 26 I.L.M. at 1556. This innovative provision may prove crucial to the success of the Montreal Protocol, since ongoing scientific investigations indicate that, without a mechanism for revising its regulatory component, the Montreal Protocol could become outdated in short order. For example, shortly after it went into effect, an "ozone hole" smaller than the one over Antarctica was discovered over the Arctic region, causing speculation that damage to the ozone layer was already worse than anticipated during the Protocol negotiations. *See* Booth, *Hole in the Ozone Layer Found at North Pole Too*, Wash. Post, March 16, 1990, at A10, col. 1. For the first publicized report of the Arctic hole, see Kerr, *Evidence of Arctic Ozone Destruction*, 240 SCIENCE 1144 (1988); Kerr, *Ozone Hole Bodes Ill for the Globe*, 241 SCIENCE 785 (1988).

Most recently, fears that the regulatory regime of the Protocol was inadequate to abate the ozone damage have inspired a three-day conference in London to consider revisions to the reduction time table of the Protocol. It is interesting to notice the new alignment of the parties at the London conference. There, the environmentalists have joined with the developing nations, charging that the United States—a principal proponent of reduction during the Protocol negotiations—is now unwilling to be sufficiently proactive. William K. Reilly, administrator of the Environmental Protection Agency, announced the United States position: a commitment to a 20% reduction of CFCs by 1993 and a complete ban by the year 2000. Many conferees charge that this approach is inadequate to protect the earth's atmosphere. In addition, developing countries are asking industrialized nations to transfer ozone-friendly technology to them on a "preferential and non-commercial basis." The United States is resisting this approach. *See* Frankel, *U.S. Stance Criticized at Ozone Conference*, Wash. Post, June 28, 1990, at A34, col. 1. However, conferees have been able to agree on establishing a fund of at least $160 million for distribution to developing countries over the next three years to aid them in eliminating technologies harmful to the ozone layer. Frankel, *Governments Agree on Ozone Fund*, Wash. Post, June 30, 1990, at A1, col. 5.

The position of the Bush administration notwithstanding, as of August 4, 1990, both houses of Congress had agreed upon legislation committing the United States to a more rapid phase-out of CFCs than required by the London conference discussed above. Weisskopt, *Conferees Agree on Ozone Plan*, Wash. Post, Aug. 4, 1990, at A4, col. 1.

[54] The substantive provisions of the Montreal Protocol are found in articles 2 through 10. *See* Montreal Protocol, *supra* note 1, *reprinted in* 26 I.L.M. at 1552–57. Specifically, article 2 provides control measures for CFC compounds and halons wherein the parties to the Protocol must freeze and gradually reduce their production and consumption of these "controlled

ronmental law from its inception in 1972 with the precatory statement of Principle 21.[55] While the exhortation of Principle 21 is implicit in the provisions of the Montreal Protocol,[56] its regulatory regime exhibits a substantive commitment to resolving the transboundary environmental problem of ozone depletion. The acclaim it

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substances." *Id.*, *reprinted in* 26 I.L.M. at 1552–54. Article 2 requires each party to freeze its yearly production of the substance at 1986 levels and then reduce production to 80% of that level over a five-year period beginning July 1, 1993. This is followed by an additional reduction phase beginning July 1, 1998. *Id.* The controlled substances are divided into two groups. Group I lists the CFC compounds and their ozone-depleting potential; Group II lists the halons covered by the Protocol and their ozone-depleting potential. *See id.* annex A, *reprinted in* 26 I.L.M. at 1561. Producers are permitted to determine the mix of the substances produced as long as the substances remain within the permissible production and consumption levels. *See id.*, *reprinted in* 26 I.L.M. at 1552–54. Article 3 provides the methods for calculating permissible consumption and production levels of controlled substances. In calculating the permissible consumption level, producers are prohibited from subtracting any export of controlled substances to non-parties. *Id.*, *reprinted in* 26 I.L.M. at 1554.

Article 5 makes special concessions to developing countries that have a consumption rate of controlled substances less than 0.3 kilograms per capita. *See id.*, *reprinted in* 26 I.L.M. at 1555–56. Qualifying parties may delay compliance with article 2 provisions. A qualifying party is permitted to use an average of its consumption between 1995 and 1997 as the base for its compliance with the control measures (the base year for all other parties is 1986). *Id.* Also under article 5, non-qualifying parties agree to help qualifying parties access environmentally safe alternative substances and technology. *Id.*

While article 5 permits exceptions for certain parties, article 4 is designed to curtail activities with non-parties. *See id.*, *reprinted in* 26 I.L.M. at 1554–55. First, article 4 requires each party to ban bulk imports of controlled substances from non-party states by 1990. Parties also must ban the import of products *containing* controlled substances from non-party states within four years of the Protocol's inception. *Id.* Within five years of the Protocol's inception, the parties must determine the feasibility of banning or restricting imports of products *produced with* controlled substances from non-parties. *Id.* Exports of controlled substance technologies to non-parties or assistance to non-parties regarding controlled substance production is discouraged. *Id.* para. 5, *reprinted in* 26 I.L.M. at 1555.

Articles 6, 7, and 8 respectively provide for reassessment of the Protocol's efficacy, for reporting of relevant data, and for exchange of research data. *See id.*, *reprinted in* 26 I.L.M. at 1556. Article 8 requires parties to consider development of non-compliance enforcement mechanisms. *Id.* Articles 9 and 10 require that parties offer developing nations technological assistance in producing controlled substance substitutes. *See id.*, *reprinted in* 26 I.L.M. at 1556–57.

[55] Principle 21 of the 1972 Declaration of the United Nations Conference on the Human Environment declared that:

> States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

Stockholm Declaration, *supra* note 1, *reprinted in* 11 I.L.M. at 1420.

[56] In fact, Principle 21 is quoted in the Preamble to the Vienna Convention, the precursor of the Montreal Protocol. *See* Vienna Convention, *supra* note 1, *reprinted in* 26 I.L.M. at 1529.

has received is therefore deserved.[57] The Protocol binds the parties to specific reductions of controlled substances.[58] At the same time, the flexibility of its implementation provisions evinces a recognition of the necessity to synthesize economic and environmental concerns.[59] The Protocol is also notable for its attempt to encourage universal participation through systems of incentives[60] and disincentives.[61] The Protocol is innovative because it adopts a prospective

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[57] On the issue of transboundary air pollution, only the Sulfur Emissions Protocol of 1985 and the Nitrogen Oxides Emissions Protocol of 1988 have achieved analogous agreement on substantive reduction of the offending pollutants. *See* Sulfur Emissions Protocol of 1985, *supra* note 1; Nitrogen Oxides Emissions Protocol, *supra* note 1. For a discussion of these Protocols, see Frankel, *The Convention on Long-Range Transboundary Air Pollution: Meeting the Challenge of International Cooperation*, 30 HARV. INT'L L.J. 447 (1989).

By contrast, the United States-Canada negotiations on acid rain have progressed no further than a 1980 Memorandum of Intent. *See* Steiner, *The North American Acid Rain Problem: Applying International Legal Principles Economically Without Burdening Bilateral Relations*, 12 SUFFOLK TRANSNAT'L L.J. 1, 28 (1988).

[58] Montreal Protocol, *supra* note 1, *reprinted in* 26 I.L.M. at 1552–53; *see also supra* note 54. It has been noted that the substantial reductions under the Protocol are unprecedented in international environmental regulation. Award Paper, *supra* note 19, at 426.

[59] Montreal Protocol, *supra* note 1, *reprinted in* 26 I.L.M. at 1552–54; *see also supra* note 54. For example, nations are permitted to meet their freeze and reduction requirements, in part or even *in toto*, by eliminating non-essential uses of the controlled substances. *See supra* note 54 and accompanying text. However, the impact of this provision falls unevenly on the parties. For example, prior to ratification of the Protocol, the United States had already banned non-essential aerosol products using CFCs. Use of Chlorofluorocarbons in Self-Pressurized Containers, 21 C.F.R. § 2.125 (1990). In addition, § 157(6) of the Clean Air Act requires the EPA to promulgate regulations to curtail production of substances that damage the stratosphere if the damage "may reasonably be anticipated to endanger public health or welfare." Clean Air Act § 157, 42 U.S.C. § 7457(b) (1982); *see also* Protection of Stratospheric Ozone, 40 C.F.R. § 82 (1990) (the EPA's proposed rulemaking effective upon the Protocol's entry into force (Jan. 1989)). This rule mandates compliance with, and implementation of, the Montreal Protocol pursuant to § 157(b) of the Clean Air Act. *Id.* § 82.1.

It is apparent that countries that had no laws similar to those of the United States banning CFC aerosols prior to 1986, the base year for article 2 compliance, will be able to meet their reduction requirement under the Protocol with less impact on their economies.

[60] Montreal Protocol, *supra* note 1, art. 5, *reprinted in* 26 I.L.M. at 1555–56; *supra* note 54 and accompanying text. Article 5 encourages participation of developing countries that otherwise might find article 2 compliance unacceptably restrictive of their technological development. Montreal Protocol, *supra* note 1, art. 5, *reprinted in* 26 I.L.M. at 1555–56. It therefore affords them more lenient compliance standards. *Id.* It should be noted, however, that this leniency has the effect of encouraging increased consumption by nations that qualify for article 5 treatment. It is also unclear what the "basic domestic needs" to which an article 5 nation must limit itself can include. *Id.* Conceivably, a liberal construction of that term could expand consumption and production beyond the scope of assistance that article 5 was designed to provide.

Articles 9 and 10 encourage the transfer of technical assistance to developing countries, another important incentive for participation in the Protocol's regime. *Id.*, *reprinted in* 26 I.L.M. at 1556–57; *see also supra* note 54.

[61] Montreal Protocol, *supra* note 1, art. 4, *reprinted in* 26 I.L.M. at 1554–55. *See also*

approach—an attempt to avert environmental damage prior to catastrophe, rather than "cleaning up" after the fact.[62] It also seeks to curtail non-point source or multiple source pollution, a task of Herculean proportions.[63] Finally, its provisions for reassessment of the scientific and technological data that underpin its regulatory system and its provisions for revision in the face of those reassessments[64] surely will prove to be essential components of its success. Indeed these are vital elements of any transboundary accord in the field of environmental law.[65]

Given its notable achievements, then, it is not surprising that the Montreal Protocol is often cited as a prototype for agreements on regulation of other transfrontier pollution problems including that of acid rain.[66] But, as this Article will show, the transboundary acid rain problem between the United States and Canada has not been amenable to that sort of resolution. Specifically, it has not been the beneficiary of the kinds of fortuitous circumstances that overrode

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supra note 54. Article 4, by imposing certain restrictions on the import of controlled substances from non-party nations, seems designed to encourage them to become signatories of the Protocol. By curtailing the potential export market of non-parties, this provision appears to be an effective economic device to achieve environmental goals. However, the article's effectiveness is seriously diluted by the cautious approach of its terms. First, the ban on imports of products produced with controlled substances is deferred under article 4(4). And the ban on bulk shipments is an invitation to Protocol evasion because controlled substances could still be made available through imports of products that contain controlled substances.

It is also unfortunate that the spirit of international cooperation stopped short of including enforcement mechanisms and sanctions within the original Protocol. Montreal Protocol, *supra* note 1, art. 8, *reprinted in* 26 I.L.M. at 1556; *see also supra* note 54.

[62] Award Paper, *supra* note 58, at 424–25.

[63] *Id.* at 425.

[64] Montreal Protocol, *supra* note 1, at arts. 2(9), 2(10), 6, *reprinted in* 26 I.L.M. at 1553–54, 1556; *see also supra* note 54.

[65] It frequently has been noted that one significant shortcoming of the Protocol is that it was scientifically outdated before the "ink was dry." Clearly, the reduction compliance schedules are inadequate to meet the ozone depletion problem as scientists now understand it. *See, e.g.*, Award Paper, *supra* note 58, at 429. It has been estimated, for example, that damage to the ozone layer is occurring at a rate two or three times that assumed during Protocol negotiations. Doolittle, *supra* note 36, at 431.

What has been called "the *ultimate* problem of ozone depletion," *see* Kindt & Menefee, *supra* note 29, at 291, is the ultimate problem of environmental law generally. The open-ended nature of scientific investigation of environmental problems gives rise to conflicts within the scientific community itself concerning the causes, effects, and extent of environmental degradation. This, in turn, creates a regulatory dilemma: how far do you go in curtailing "lucrative economic activities on the basis of incomplete scientific evidence" of what may turn out to be irreversible damage to the environment. *Id.* (quoting Sand, *Protecting the Ozone Layer: The Vienna Convention Is Adopted*, ENVIRONMENT, June 1985, at 18, 40). In the face of this dilemma, then, provisions for reassessment and revision become essential to the efficacy of environmental regulation.

[66] *See, e.g.*, Kindt & Menefee, *supra* note 29, at 293.

domestic political opposition to the regulation of ozone-depleting materials that, in turn, made the Montreal Protocol possible.

As discussed above, mounting scientific evidence of substantial ozone depletion marshalled sufficient political support for the cooperative approach of the Vienna Convention. Until the Antarctic "ozone hole" was discovered, however, factions blocked efforts to establish a regulatory system. The critical juncture was reached upon publication of the "ozone hole" findings, which lent a sense of urgency to the problem, a perception that perhaps the Rubicon had been crossed.[67] Concurrently, news of the probable availability of CFC substitutes played an important role in generating the requisite domestic political support for the substantive provisions of the Montreal Protocol.[68] This latter element is important in the field of environmental regulation. Where alternatives do not seem viable, reduction of existing pollutants is likely to disrupt existing economies and lifestyles. This alone could create strong resistance to reduction agreements.

The absence of these factors in other transboundary pollution situations may mean that the Montreal Protocol's availability as a prototype may be limited. Therefore, in seeking solutions to other multilateral environmental problems, additional guidance may be found in other approaches. In that regard, the United States-Canada Free Trade Agreement of 1988 unintentionally may have provided a very different model for environmental solutions.

III. Acid Rain and the United States-Canada Free Trade Agreement of 1988

A. The Problem: Acid Rain

Rainfall in the northeastern United States and southeastern regions of Canada is increasingly acidic.[69] Emissions from industrial sources and vehicles contain sulphur dioxide (SO_2) and nitrogen oxides (N_xO_y). These sources are almost exclusively the cause of the problem.[70] Of these two sources, seventy-one percent of sulphur

[67] *See supra* notes 29–42 and accompanying text.

[68] *See supra* notes 43–49; *see also* Doolittle, *supra* note 36, at 429 n.180 (proposition that the availability of CFC substitutions transforms the ozone depletion issue to a problem capable of resolution with relative ease).

[69] Oppenheimer, *Reducing Acid Rain in Eastern North America: The Scientific Basis for an Acid Rain Policy*, 19 MICH. J. OF L. REFORM 989, 989 (1986).

[70] Steiner, *supra* note 57, at 5. For a more thorough discussion of acid rain, see *id.* at 5–12.

dioxide emissions come from electricity-generating plants, most of which use coals as a fuel.[71] Electric utilities account for thirty-one percent of the nitrogen oxide emissions.[72] These oxides may fall directly to earth (after being emitted from the end-of-the-stack or the end-of-the-pipe) as dry deposition, or they may be chemically transformed as they travel through the atmosphere and mix with precipitation, thence falling to earth in the form of wet deposition or "acid rain."[73]

Scientists have been able to trace the source of oxides falling as acid rain in southeastern Canada and northeastern United States by factoring in the variables of air current, emission patterns, and unique trace elements from burning particular fuels (called "regional signatures") in the precipitation.[74] Their studies indicate that a major source of acid rain in southeastern Canada and the northeastern United States are United States power plants located in the Midwest.[75] "Tall stacks," smokestacks that allow utilities and industries to burn inexpensive high sulphur coal without violating the United States Clean Air Act, facilitate oxide transport from the Midwest.[76] Canada claims that one-half of the acid rain damage in its southeastern region is attributable to these Ohio Valley emissions.[77]

Acid rain is environmentally damaging.[78] Water bodies lose their pH balance.[79] As a result of watershed acidity, toxic metals enter into ground and surface water; aquatic life dies; nutrients dissipate; and fungi and bacteria in watershed soil may be destroyed.[80] Acid

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[71] OFFICE OF TECHNOLOGY ASSESSMENT, ACID RAIN AND TRANSPORTED AIR POLLUTION: IMPLICATIONS FOR PUBLIC POLICY 265–99 (1984), *cited in* Moller, *The United States-Canadian Acid Rain Crisis: Proposal for an International Agreement*, 36 UCLA L. REV. 1207, 1208 n.5 (1989).

[72] *Id.*

[73] *See* Oppenheimer, *supra* note 69, at 990.

[74] *See* Steiner, *supra* note 57, at 7–10.

[75] *Id.*

[76] *Id.* at 17–19. *See also* Clean Air Act § 123, 42 U.S.C. § 7423 (1988). Tall stacks have enabled utilities and industries to avoid technical violation of the Clean Air Act because the pollutants they expel do not fall in the area surrounding the plants (where the compliance measurements are taken). Instead, these pollutants travel downwind to the northeast United States, as well as over the Canadian border. Congress attempted to correct this problem with its 1977 amendment to § 123 of the Clean Air Act. For a discussion of this amendment and the promulgated regulations thereunder, see Steiner, *supra* note 57, at 19–21. The amendment merely calls for a "good engineering practices" standard for measuring tall stacks, and EPA regulations have failed to clarify that standard.

[77] Carson, *Environmental Protection, Unfair Competition and the U.S.-Canada Free Trade Discussions*, 12 CANADA-U.S. L.J. 263, 266 (1987).

[78] *See* Steiner, *supra* note 57, at 5–12.

[79] Oppenheimer, *supra* note 69, at 990–92.

[80] *Id.*

rain also shortens the life span and growth rate of trees, reduces crop yields, and corrodes building materials.[81] It is also damaging to the human respiratory system.[82]

Ample evidence that United States Ohio Valley pollutants are the primary source of southeastern Canadian acid rain has been mounting since the 1970s.[83] That evidence inspired two agreements between the United States and Canada on the subject: the 1979 Joint Statement on Transboundary Air Quality[84] and the 1980 Memorandum of Intent Concerning Transboundary Air Pollution.[85] These

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[81] *Id.*

[82] *Id.*

[83] Moller, *The United States-Canadian Acid Rain Crisis: Proposal for an International Agreement*, 36 UCLA L. REV. 1207, 1212 (1989).

[84] *See* 1979 Joint Statement on Transboundary Air Quality Talks, *reprinted in* DEP'T ST. BULL., Nov. 26, 1979, at 26. This Joint Statement was largely the result of the efforts of the Bilateral Research Consultation Group on Long-Range Transport of Air Pollutants (LRTAP), which was set up in 1978. *See* Steiner, *supra* note 57, at 27.

[85] Memorandum of Intent Concerning Transboundary Air Pollution, Aug. 5, 1980, United States-Canada, 32 U.S.T. 2521, T.I.A.S. No. 9856 [hereinafter Memorandum of Intent]. The LRTAP also designed the Memorandum. *See supra* note 84.

On the issue of transboundary air pollution, both countries are parties to the following multilateral agreements: the Geneva Convention on Long-Range Transboundary Air Pollution of 1979, the Vienna Convention for the Protection of the Ozone Layer, and the Montreal Protocol on Substances that Deplete the Ozone Layer. *See supra* note 1. However, the United States refused to attend the Ottawa Conference, hosted by Canada, which drafted the 1984 Declaration on Acid Rain. Signatories of the Declaration are deemed members of a "thirty percent club" in which the signatories, by common consensus, agreed to reduce their SO_2 emissions to at least 30% of 1980 levels by 1993 and to reduce N_xO_y emissions as much as possible. For a discussion of the Declaration, see Steiner, *supra* note 57, at 28–30. The United States was not a signatory of the Declaration. At the time the Reagan administration adopted a "more research-no action" policy but did agree to join Canada in further research into the problem. *Id.* at 29 n.128.

On the issue of transfrontier environmental problems, generally, between the two countries, the United States and Canada relationship can be traced as far back as the 1909 Boundary Water Treaty. Boundary Waters Treaty of 1909, Jan. 11, 1909, United States-Great Britain, 36 Stat. 2448, *reprinted in* 31 Int'l Env't Rep. (BNA) 401 (1978). It dealt primarily with water quality, but also established a precedential approach that mandates against transboundary pollution between the two countries. *See id.* The Treaty also established the International Joint Commission (IJC), a permanent quasi-judicial commission to address environmental problems between the two countries. *Id.* at 403. It has been suggested that the IJC's jurisdiction be expanded. It could then act as a forum for resolution of the acid rain conflict. *See* Steiner, *supra* note 57, at 12, 13 n.51. The IJC did decide a landmark case in environmental law, the Trail Smelter case. Trail Smelter Arbitration (U.S. v. Canada), 33 AM. J. INT'L L. 182 (1939) (interim decision), 35 AM. J. INT'L L. 684 (1941) (final decision). That case marked the first time a tribunal had dealt with the liability of a country for its transboundary air pollution. The IJC decided that British Columbia was liable for damage from sulphur dioxide air pollution to property in Washington State. *Id.* For a discussion of the development of case law and customary law relative to transboundary pollution, see Steiner, *supra* note 57, at 12–17; Note, *Our Neighbor's Keeper? The United States and Canada: Coping With Transboundary Air Pollution*, 9 FORDHAM INT'L L.J. 159, 169–76 (1985).

Unilaterally, of course, each country has its own legal regime for curtailing ambient air

agreements are analogous to the Vienna Convention.[86] They evince a concern over the issue, and the Memorandum of Intent calls for a cooperative effort by the two countries to continue to study the issue and to share their respective research findings.[87] While recipients of the Ohio Valley acid rain pollutants on both sides of the border have

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pollution. Provisions of the United States Clean Air Act are found at 42 U.S.C. §§ 7401–7642 (1982). Provisions of the Canadian Clean Air Act of 1971 are found at CAN. REV. STAT. ch. C-32 (1985). In Canada the jurisdiction of regulation is divided between the Canadian federal government and the provincial governments. *Id.* § 20.

Under the Canadian Clean Air Act of 1971, the federal government may impose air quality standards only where life or health are at stake or to curtail transboundary (national or provincial) pollution. *Id.* §§ 8, 24. For power plant emissions it construes its authority narrowly, as merely advisory. *See* H. LEE, N. FOSTER & E. PALSON, CANADIAN ELECTRICITY IMPORTS: AN ASSESSMENT OF THE NATIONAL SECURITY, ECONOMIC AND ENVIRONMENTAL IMPLICATIONS 45 (Energy and Environmental Policy Center, John F. Kennedy School of Government). Pursuant to that authority, it has established advisory ambient air quality standards and a monitoring network to collect ambient air quality data. *Id.* at 46. The standards and data cover sulfur dioxide, ozone, nitrogen oxides, carbon monoxide, and particulates, on a scale from "maximum desirable" (for example, 0.02 parts per million (ppm) for SO_2, permitting short periods of higher concentration) to "maximum acceptable," to "maximum tolerable." The comparable United States standard is 0.03 ppm, with an additional short-term allowance for SO_2. *Id.* at 47. However, since the short-term allowance for higher concentrations under Canadian law is 0.11 ppm for 24 hours and 0.34 ppm for one hour, compared with 0.14 ppm for a 24-hour average and 0.5 ppm for a three-hour average, on balance the Canadian standards for SO_2 are more stringent. *Id.* The provinces of Alberta and Saskatchewan have adopted the most stringent Canadian standards ("maximum desirable") while Ontario, Quebec, and New Brunswick enforce the "maximum acceptable" standards. *Id.* at 48. Across the board, these enforceable constraints are at least as stringent as those of the United States. *Id.* at 54.

In addition, under the Canadian Acid Rain Program, the seven eastern provinces have committed themselves to reducing SO_2 to one-half of 1980 permissible levels by 1994. On a national average, electricity-generating facilities in the United States contribute significantly higher levels of SO_2 to the ambient air (68% in 1985, for example) than do their Canadian counterparts (28% in 1984). *Id.* at 47. On a national average non-ferrous smelting operations are the biggest SO_2 emission offenders in Canada. *Id.* at 48. Among the provinces, only Ontario and New Brunswick have appreciable SO_2 emissions from electricity-generating facilities. *Id.* In Ontario, for instance, 20% of its SO_2 emissions were attributable to Ontario Hydro in 1986. *Id.* at 49. Ontario Hydro's program to reduce these emissions, in order to comply with the 1994 levels required by the Canadian Acid Rain Program, include a mix of purchasing power from Hydro-Quebec, replacing coal generation with several small nuclear and hydro facilities, switching to lower sulfur coal, and end-of-the-stack technologies. *Id.* at 50–54. It is important to point out that Ontario's emission standards apply to both new and old stationary sources while the counterpart standards under United States law cover only new stationary sources. Old United States plants are subject only to the more lenient State Implementation Plans. Clean Air Act §§ 110, 111, 42 U.S.C. §§ 7410–7411 (1977). Under United States law, then, Ontario Hydro's coal-fired plants at issue here would not be covered by comparable standards. The example above is indicative of the evidence that, as to ambient air quality, Canadian law is at least as stringent as comparable United States law.

[86] *See supra* notes 29–34 and accompanying text.

[87] *See* Moller, *supra* note 83, at 1211.

continued to push for stringent controls,[88] they have not been able to garner sufficient political support in the United States for a bilateral regulatory regime. More precisely, the domestic political forces of the coal lobby—with the blessings of the Reagan administration—impeded all efforts during the 1980s to achieve a bilateral accord on regulation.[89]

During FTA negotiations, while Canada initiated proposals for an agreement on reduction of wet sulfate depositions, the Reagan administration retreated to a wait-and-see haven.[90] Representative Dingell (D-Michigan), speaking in support of Midwest coal interests, opined that as to acid rain, "its causes and effects are at best at this time obscure, if not, in fact, unknown."[91] The use of scientific disputes on environmental issues by political opponents of pollutant regulation is reminiscent of similar tactics employed in the debates during the Vienna Convention.[92]

Secretary Donald Hodel (Secretary of the Interior in the Reagan administration) went even further. In February 1987, he charged that Canadian initiatives on acid rain regulation during the negotiations were motivated by an attempt to increase sales of Canadian

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[88] While the FTA negotiations were going on, Senator Mitchell (D-Maine) and Senator Stafford (R-Vermont) each introduced stringent command and control legislation in Congress. During the same period Canada submitted its own proposal for bilateral accord for reduction of wet sulfate depositions. *See* Carson, *supra* note 77, at 265–67.

[89] It should be noted that during the decade of the 1980s, when negotiations on the FTA were underway, legally enforceable mechanisms were available that could have offered partial solutions to the acid rain problem. *See supra* note 85. Section 7415 of the United States Clean Air Act affords a foreign nation the right to affect the enforcement of provisions of the Act, and § 7423 seeks to curtail the "tall stack" problem. 42 U.S.C. §§ 7415, 7423 (1988). However, as construed by the EPA and the courts, these provisions have been ineffective. *See, e.g.*, Thomas v. New York, 802 F.2d 1443 (D.C. Cir. 1986), *cert. denied*, 482 U.S. 919 (1987). In *Thomas*, the appellate court refused to accept the EPA's acknowledgment of the transboundary acid rain problem as sufficient to trigger the mandatory provisions of § 115, 42 U.S.C. § 7415, that a foreign nation be accorded rights under the Clean Air Act. For a discussion of both sections of the Act, see Moller, *supra* note 83, at 1211, 1218.

[90] Carson, *supra* note 77, at 263. It is typical of this "don't be precipitous" approach to rely on dispute within the scientific community on the issue to justify the position. A similar scenario was witnessed during debates on the proposals for regulation during the Vienna Convention. *See supra* note 35 and accompanying text. On the subject of acid rain there were divisions within the scientific community on the acid rain problem during FTA negotiations. *See, e.g., Complexity, Unknowns Continue to Stir Debate over Source-Receptor Relationship in Acid Deposition*, 17 Env't Rep. (BNA) 1360 (1986).

[91] Carson, *supra* note 77, at 264. It should be noted that Representative Dingell more recently has lent his support to President Bush's draft clean air bill calling for a permanent cap on sulphur dioxide emissions. Weisskopf, *Behind the Clean Air Bill: A Balancing of Interest*, Wash. Post, July 30, 1989, at A16, col. 1.

[92] *See supra* note 90.

excess hydroelectricity to United States markets.[93] The final draft of the FTA skirted the acid rain regulation issue entirely, and the FTA section on energy is remarkable for its brevity.[94] Sales of hydroelectricity were included, not as a trade-off for acid rain controls, but as an energy exchange: inexpensive Canadian hydropower to United States markets in exchange for Canadian access to Alaskan oil.[95]

Unlike proponents of ozone regulation prior to ratification of the Montreal Protocol, advocates of acid rain regulation during FTA negotiations could point neither to news of scientific findings with apocalyptic overtones, nor to published reports of available substitutes for the polluting sources. The negotiators were unable to generate the requisite United States domestic political support to override opposition of the United States coal lobby to bilateral acid rain regulation. Nor was it politically feasible to juxtapose acid rain and hydropower trade-offs explicitly within the purview of the FTA. Nevertheless, an interrelationship between acid rain abatement and the sale of Canadian hydroelectricity can be anticipated under implementation of the FTA. This interrelationship will be discussed in subsequent sections of this Article.[96]

B. The United States-Canada Free Trade Agreement of 1988

The United States and Canada have a checkered history of trade relations because each country periodically expresses its own protectionist sentiments.[97] The United States-Canada Free Trade Agreement seems to usher in a new era of bilateral agreement. This spirit of bilateralism was inspired primarily by the perception that it will facilitate the two countries' success in competing in an increasingly aggressive global market.[98] The FTA was signed by Prime

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[93] This position was disavowed by the Reagan administration. Carson, *supra* note 77, at 264.

[94] *See* FTA, *supra* note 11, § 305.

[95] Ganezer, *The Proposed Canada-United States Free Trade Area: A Phoenix Arises*, 5 PAC. BASIN L.J. 132, 133 (1986). Canada will have access to up to 50 thousand barrels per day of Alaskan oil, but it must be transported from the lower 48 states.

[96] *See infra* notes 116–41 and accompanying text.

[97] For a thorough discussion of the alternating rhythms of protectionism in United States-Canada trade relations, see MacDonald, *An Overview of the Prospects for Sectoral Integration: The View from Canada*, 10 CANADA-U.S. L.J. 3 (1985).

[98] Ganezer, *supra* note 95, at 132. The United States and Canada are the world's largest trading partners, and Canada is especially dependent on the United States for trade—over

Minister Brian Mulroney and President Ronald Reagan on January 2, 1988. It became effective on January 1, 1989.[99]

The FTA is designed to eliminate trade barriers in the form of tariffs and quotas and to encourage non-discriminatory trade prac-

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75% of all Canadian exports go to United States markets. DEP'T ST. BULL., July 1988, at 24; 3 ABA SEC. NAT. RESOURCES L., Winter 1989, at 4, 35.

[99] FTA, *supra* note 11. The legal structure for ratification and implementation of trade agreements in the United States differs significantly from the Canadian legal structure. The process under United States law is set out in the Trade Act of 1974 as amended. 19 U.S.C. §§ 2101–2495 (1988). For an overview of the procedures as employed during FTA negotiations and ratification, see S. REP. NO. 509, 100th Cong., 2d Sess. 4 (1988), *reprinted in* 1988 U.S. CODE CONG. & ADMIN. NEWS 2395. For discussions of the Canadian process, see Fry, *The Role of State and Provincial Governments in Canada-U.S. Sectoral Integration*, 10 CANADA-U.S. L.J. 169 (1985); Quinn, *Federalism and Foreign Economic Relations*, 10 CANADA-U.S. L.J. 197 (1985); Steger, *Canada-U.S. Free Trade Agreement and the Omnibus Trade Bill*, 2 REV. INT'L BUS. 71, 72 (March 1988).

Under United States law, § 612 of the Trade Act of 1974 (Act) expresses Congressional sentiment favoring a free trade agreement with Canada for the purpose of enhancing the economic stability of both countries. S. REP. NO. 509, *supra*, at 3. Under § 102(b) of the Act, as amended, the President is authorized to enter into bilateral agreements for the purpose of reducing or eliminating trade barriers to products traded between the United States and other nations. *Id.* Subject to specific procedural requirements set forth in the Act, as amended by the Trade and Tariff Act of 1984 and the Omnibus Trade and Competitiveness Act of 1988, these trade agreements may be expeditiously ratified under "fast-track" consideration. *Id.* Pursuant to these statutorily mandated procedures, the Reagan administration notified Congress on December 10, 1985, of Canada's formal request to negotiate a free trade agreement. *Id.* at 4. "Fast-track" procedure requires that the Executive cannot proceed with negotiations if the request is disapproved within 60 session days from the Executive's notification. *Id.* A motion to disapprove before the Finance Committee of the Senate was defeated by a tie vote of 10-to-10 on April 23, 1986; therefore, negotiations were initiated. *Id.* Opposition to negotiations was attributed to congressional fear that it would not be adequately consulted during the negotiation process. *Id.* at 5. On October 3, 1987, the administration notified Congress of its intent to enter into a free trade agreement with Canada on January 2, 1988, upon successful culmination of the negotiations. *Id.* However, since the final text of the proposed agreement was not available until January 2, 1988, President Reagan was unable to fulfill his statutory obligation to consult fully with the congressional committee having jurisdiction over the various matters covered by the agreement. *Id.* Compensatory measures, in the form of an exchange of letters between congressional leaders and Cabinet officers, permitted the process to continue within the spirit, if not the letter, of § 102(c). *See id.* at 6. As required by the Act, President Reagan submitted the final text of the agreement, along with the implementing legislation and other requisite documents, to Congress on July 25, 1988, where they were favorably reported, thus completing the "fast-track" procedure. *See id.* It should be noted that congressional opposition during the process concerned, not the substance of the document, but fears that the President would breach his statutory duty to consult with Congress adequately during negotiations. *Id.* at 5. Both the United States procedural process and the political sentiment underlying it stand in stark contrast to concurrent process and sentiment in Canada during the same period of time.

During the recent campaign for Prime Minister, opposition to the agreement from certain sectors of the Canadian population was well-publicized. Fundamentally, the opposition arose from the fear of a loss of Canadian political and economic independence. MacDonald, *supra*

tices between Canada and the United States. It also facilitates investments and financial services between the two countries.

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note 97, at 4. With the victory of Prime Minister Brian Mulroney came the apparent defeat of the opposition forces. But as an analysis of the jurisdictional issues pertaining to ratification and implementation of the agreement reveals, these forces may be down but not out.

Conceptually, the Canadian process for ratification and implementation of agreements with foreign nations is less structured than that of the United States. The authority to negotiate and ratify these agreements is the sole prerogative of the Canadian federal government. Neither the federal Parliament nor the provincial governments plays a formal role in ratification procedure. However, it is at the implementation level, where legislation is required to effect the provisions of an agreement, that the powers of sub-national government branches emerge. The apparent simplicity of this division of governmental authority belies a complexity of overlapping and competing jurisdiction. *See* H. LEE, N. FOSTER & E. PALSON, *supra* note 85, at 44–45.

By contrast, the parallel system under United States law is relatively straightforward. At the federal level, § 102(a) of the Trade Act of 1974 establishes the rule that agreements ratified under its provisions are not self-executing. This means that conflicting *federal* laws not superseded under the terms of an agreement's implementing legislation will prevail. Conversely, § 102(b) of the Act provides that the provisions of an agreement will prevail over any conflicting *state* laws. Further, the federal government may challenge inconsistent state laws through the judicial process. The Constitutional underpinnings of these provisions are to be found in articles I and VI. U.S. CONST. art. I, § 8, cl. 3, art. VI, cl. 2.

As noted above, Canadian law concerning agreements with foreign countries operates under a system of decentralized federalism and overlapping jurisdiction. Quinn, *supra*, at 197. This system reflects a historically strong sense of regionalism in Canada, at the expense of its national identity. Fry, *supra*, at 176. So, for example, while Canadian law unequivocally provides that the federal government has exclusive jurisdiction over inter-provincial motor vehicle traffic, it is the provinces that have exercised regulatory authority in this matter since 1954. Quinn, *supra*, at 202. Most Canadian legal authorities agree that the Canadian Constitution grants the federal government exclusive jurisdiction to make legally enforceable agreements with foreign nations. That view was adopted by its Supreme Court in a 1984 case. *Id.* at 210. In another case, the Privy Council ruled that the power to implement these international obligations is divided between the federal government and the provinces. This is consistent with the general division of subject-matter jurisdiction under the B.N.A. Act of 1867 (known as the "Constitution Act"), a constitutional approach mandating that general grants of power to the federal government (for example, § 132 of the B.N.A. granting the federal government authority to make treaties) should be narrowly construed. *Id.* at 211. The provincial authority in this arena derives partially from the "property and civil rights" clause of the Constitution. This has been interpreted to include, among other things, provincial authority over land use affecting waterbodies, and provincial ownership of the beds of lakes and rivers. On the other hand, the federal government's jurisdictional authority includes, in addition to foreign relations, navigation, fisheries, works "for the advantage of Canada," and matters concerned with "peace, order and good government." With respect to water quality, the federal and provincial governments have concurrent jurisdiction. Thus, on this subject of water alone, it can be seen that three different sovereign scenarios are possible. It is clear that the issue of implementation of the agreement under Canadian law will revolve around the determination of subject-matter jurisdiction. Therefore, a cursory examination of the division of jurisdiction between the two levels of government as it pertains to various subjects covered by the agreement may be in order.

With regard to products seeking markets within provinces, provincial governments are permitted to impose a wide range of "non-tariff" measures to protect local industries. These measures include subsidies that favor local industries, and taxes and regulations that discrim-

Consistent with article XXIV of the General Agreement of Tariffs and Trade (GATT),[100] the FTA creates an area of free trade that eliminates certain trade barriers in three phases over a ten-year period.[101] Only those products that meet Rules of Origin requirements will be accorded FTA free trade treatment.[102] Products from third countries shipped through one FTA party to the other in order to avoid tariffs are not accorded free trade status. However, products of either party that contain third country components significantly changed in production will receive free trade status pursuant to the International Convention on the Harmonized Commodity Description and Coding System.[103] Liberalized customs procedures under the Act are also designed to protect the free trade status of party products.[104] Customs fees will be eliminated by 1994.[105] "Buy national" restrictions are eliminated in accordance with the GATT Government Procurement Code.[106]

By contrast with the Montreal Protocol, the FTA provides dispute resolution mechanisms. Title IV of the FTA provides for resolution of disputes arising under its terms.[107] When a dispute arises under

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inate against foreign producers and producers from other provinces. Quinn, *supra*, at 199. In the financial services sector, many provinces explicitly prohibit foreign-owned businesses from entry into their financial services market. Moreover, it has been asserted that these measures are specifically designed to curtail entry by United States firms. *Id.* at 204. Regarding agricultural products, provinces avail themselves of three legal techniques to protect local producers: subsidies for domestic produce, product and quality regulations that have the effect of discrimination against out-of-province produce, and agricultural marketing boards that have the authority to enact discriminatory distribution and marketing rules. *Id.* at 205. In the industrial sector, a wide range of support programs favor domestic manufacturers. These include direct subsidies, grants and loans, and special corporate income tax deductions and exemptions. *Id.* at 207. Finally, and of particular concern in this study, provincial governments pursue various policies to protect their natural resources industries, principally implemented through a variety of taxing techniques. *Id.* at 206. It remains to be seen whether these measures will be used to impede implementation of the FTA, and if so whether ongoing negotiations will successfully resolve the inherent conflict.

[100] General Agreement of Tariffs and Trade (GATT), Oct. 30, 1947, *as amended*, Basic Instruments and Selected Documents, vol. IV, 61 Stat. (pt. 5) A3, T.I.A.S. No. 1700, 55 U.N.T.S. 188. Ninety-four nations are currently members of the GATT trading system. *See generally* Comment, *GATT-Legal Application of Safeguards in the Context of Regional Trade Arrangements and its Implications for the Canada-United States Free Trade Agreement*, 71 MINN. L. REV. 1488, 1492–1500 (1989).

[101] *See* FTA, *supra* note 11, §§ 201–207.

[102] *See id.* § 202.

[103] *See* S. REP. NO. 509, 100th Cong., 2d Sess. 128 (1988), *reprinted in* 1988 U.S CODE CONG. & ADMIN. NEWS 2395, 2407.

[104] *See* FTA, *supra* note 11, §§ 203, 204, 304.

[105] *Id.* § 204.

[106] *See id.* § 306.

[107] *See id.* §§ 401–410.

the terms of the FTA, application for resolution may be made to the Canada-United States Trade Commission (Commission). The Commission is empaneled under the FTA and composed of Cabinet-level personnel. Each country must give notice and the opportunity for consultation to the other member country where existing or proposed legislation or executive orders will affect implementation of the FTA. Either country may request consultations with the other member to resolve conflicts. If consultation fails to resolve any dispute, either member may make application to the Commission requiring it to convene within ten days and address the issue. The Commission may employ one of several vehicles for dispute resolution, including the service of an appointed mediator or expert advisors to assist in consensus resolution. If no settlement is reached by this form of mediation, the Commission may make its own final decision. When the Commission fails to reach a consensus decision, a member country may withdraw from the offending country benefits equivalent to those at issue in the dispute.

Each country will continue to enforce its own anti-dumping and countervailing duty laws, which protect the domestic economy from foreign unfair trade practices, during a seven-year period or until a bilateral approach is developed and agreed upon.[108] If there is no agreement on the bilateral approach in seven years, either country may terminate the Agreement. During that seven-year period, however, domestic judicial review will not be available. Final orders of the Department of Commerce or the International Trade Commission in the United States, and the Department of National Revenue or the Canadian Import Tribunal in Canada, must be reviewed by a bilateral panel that will have exclusive jurisdiction to determine whether the respective agency's decision complied with its domestic law under the standards of review applicable to the case.[109] A panel will be convened at the request of either country, and an aggrieved private citizen of either country can compel its government to make a request. In addition, where either government proposes modification of its existing anti-dumping or countervailing duty laws, the other member country must be named in the legislation and given notification and the opportunity to engage in consultation. Disputes that cannot be resolved through the consultation process may be referred to a binational panel for its recommendations. If this mechanism fails to achieve a mutually agreed-upon resolution, the ag-

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[108] For a discussion of these duty laws, see Steger, *supra* note 99, at 79.

[109] *Id.* at 83–84.

grieved country may enact equivalent legislation or terminate the FTA.[110]

The FTA deals individually with specific sectors of trade covered by the Agreement.[111] Section 305 of the Agreement deals with energy trade. The FTA seeks to improve predictable development of bilateral trade in energy products by reducing government interference in energy trade between the parties.[112] The Agreement explicitly covers trade in coal, natural gas, oil, uranium, and electricity. It prohibits trade restrictions except where necessary to stabilize domestic markets, or prevent domestic shortages or depletion of an energy resource. Additional provisions require that the exceptions not be imposed so as to disrupt the energy flow between the two countries. These terms are intended to meet the dual goals of energy security and market predictability for both Canada, as net supplier, and the United States, as net importer, in energy trade.[113]

In addition, annexed to the FTA are terms for mandatory changes in existing domestic statutes and regulations that are designed to conform domestic law to the FTA's terms. Among these are an exemption for the United States from Canada's least-cost alternative test for the export of electricity and a guarantee of non-discriminatory treatment for British Columbia Hydro's access to the California electricity market.[114] Thus, the FTA is designed to encourage trade in energy products including hydroelectricity.

Opposition within the United States to the sale of Canadian hydroelectricity to United States markets has come primarily from those states that rely on the coal industry as a major employer and as a major supplier of energy to industrial and utility facilities: Illinois, Indiana, Ohio, Pennsylvania, Kentucky, and West Virginia.[115] This region obviously fears displacement of coal as an energy source (especially the high-sulphur coal found in the eastern states) by the inherently cheaper and more environmentally benign hydroelectricity. Their fears may be well-grounded. The next section of this Article identifies the forces that will impel increased United States imports of Canadian hydroelectricity, and it indicates how, without addressing the acid rain problem explicitly, the FTA may serve to ameliorate the problem through the play of market forces.

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[110] *Id.* at 84.

[111] FTA, *supra* note 11, title III.

[112] *See* Steger, *supra* note 99, at 77–78.

[113] *Id.*

[114] S. REP. NO. 509, *supra* note 99, at 63–64.

[115] *See* Carson, *supra* note 77, at 264.

IV. THE INTERNATIONALSHIP OF UNITED STATES ENERGY REQUIREMENTS, CANADIAN HYDROELECTRICITY, AND THE ACID RAIN PROBLEM

A. United States Energy Requirements

United States energy needs have been volatile in recent decades. They grew exponentially during the 1960s and then plummeted to almost one-half the 1960s rate during the 1970s as prices rose and the economy slowed.[116] During the first half of the 1980s, demand began to rise again gradually, at the rate of 1.9% per year. Experts were then predicting a mere 2%-per-year increase to the end of the century.[117] But in 1987–1988, the rate jumped to 4.5% per year, and that trend continues unabated.[118] United States utility companies realize they are confronted by difficult choices in meeting new forecasts for United States energy consumption to the end of the century.[119] Some prospects for expanding generating capacity are more promising than others. Co-generation and independent producer sources offer a partial solution. Nuclear power faces onerous economic and public perception obstacles.[120] Investment in large-scale traditional plants entails the risk of overbuilding. Further, petroleum fuel sources for these plants, and the environmental regulatory regimes that accompany them, are expensive, while the cheaper fuel source, coal, is environmentally destructive.[121]

The cheapest and most widely used renewable power source is hydropower. Large hydroelectricity plants currently generate electricity at less than a half cent per kilowatt hour.[122] All available sites in the United States for large hydro projects have already been developed. Further, experts predict that United States hydro production may decline in the next three years as fifty-year federal licenses for many small and medium-sized generators expire, and operators decline to endure the relicensing process.[123] Only marginal expansion in domestic hydroelectric power can be anticipated, and it will take the form of adding or refurbishing turbines in existing

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[116] *Power to Burn*, Wash. Post, July 31, 1989, at A14, col. 1.

[117] *Id.*

[118] *See id.*

[119] Lippman, *The Demand for Electricity*, Wash. Post, June 18, 1989, at A18, col. 5.

[120] Cook, *Nuclear Follies*, FORBES, Feb. 11, 1985, at 82.

[121] *See Power to Burn*, *supra* note 116, at A18, col. 6.

[122] Rader, *Power Forecast: Sunny, Breezy, Wet*, Wash. Post, July 23, 1989, at D3, col. 5.

[123] Lippman, *Energy Dept. to Promote Conservation, New Fuels*, Wash. Post, Jan. 27, 1990, at A3, col. 5.

plants, retrofitting generating capacity on flood-control dams, or adding pumped hydro storage capacity to upper reservoirs to meet peak period demand.[124] Most additional hydroelectric power will, therefore, come from Canadian sources.

B. Importing Canadian Hydroelectricity

Since 1970, sales of Canadian hydroelectricity to United States markets have multiplied. In 1970, Canadian exports of hydropower to the United States stood at 2.4 million megawatt hours (mwh); by 1984, that figure had grown to 39.5 million mwh.[125] In 1986, the total amount was 35,300 gigawatt hours (GWH), for which the United States paid $768 million (in United States dollars, or 30 mills/kwh in Canadian dollars).[126]

Prices for Canadian hydroelectricity are set by the United States markets into which they are sold. Both before and after ratification of the FTA, contracts for Canadian hydro established prices as a percentage (usually eighty percent) of the cost to produce the same amount of power in the United States.[127] This latter figure is usually computed as the "avoided cost" of having to construct a new coal facility in the United States.[128] So, for example, a unit of power that cost ten cents to produce in Canada, and a dollar to produce in a new coal facility in the United States, might sell for eighty cents under these contracts.[129] This "split-the-profits," or "split-the-savings," arrangement is obviously advantageous to both countries.[130] In 1986, it is estimated that the United States saved up to $275 million under this avoided cost arrangement.[131]

This cost-of-production differential is created principally because the production of hydroelectricity entails minimal fuel costs.[132] Additional savings to purchasers accrue from the fact that construction of most Canadian hydroelectricity facilities is funded by the Canadian government.[133]

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[124] *See* Rader, *supra* note 122.

[125] Carson, *supra* note 77, at 267.

[126] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 32. The Department of Energy reports that there has been no change in that price during the initial post-FTA period—1989. Telephone interview with Department of Energy official (Apr. 17, 1990).

[127] *See* Carson, *supra* note 77, at 267.

[128] *See* H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 30.

[129] Carson, *supra* note 77, at 284.

[130] *See id.*

[131] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 70.

[132] Carson, *supra* note 77, at 267.

[133] *Id.*

Substantial increase in Canadian exports of hydroelectricity during the last two decades was attributable to the fact that Canadians, like their United States counterparts, overestimated domestic demand and, therefore, overbuilt their hydro capacity in the 1970s.[134] This construction resulted in excess capacity that has been exported to United States utilities. Because of the limitations of transmission technology, the United States is the only viable market for Canadian excess hydro capacity.[135]

Government officials forecast that Canadian exports of hydroelectricity will exceed 63,000 GWH by 1995. This represents a thirty-six percent increase within a decade.[136] To date, to the extent that the purchase of Canadian hydropower has displaced a pre-existing source of United States energy, it has replaced primarily imported oil, not domestic coal. In the current United States political climate, any mechanism that can reduce the resurgent United States dependence on oil imports without incurring other social costs is bound to receive almost unanimous acclaim domestically. If, however, the incipient Clean Air legislation, as enacted, significantly ratchets down controls on fossil fuel emissions, one result could be an appreciable rise in the cost of coal as an energy source. This, in turn, would widen the price discrepancy between domestic coal, as a power source, and imported hydropower, making the latter an attractive alternative to coal.[137] Even without the additional costs associated with Clean Air Act amendments, Canadian hydro represents a cost-effective alternative to coal. Current estimates for future coal capacity are between forty-one and sixty-four mills/kwh in New England, between twenty-three and fifty-three mills/kwh for the upper Midwest, and between thirty-seven and sixty-three mills/kwh on the West Coast.[138] Cost of compliance under the Clean Air Act amendments could lower the estimates and raise the amount of Canadian hydroelectric imports above the amount currently predicted.[139]

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[134] *See id.*

[135] McLachlan, Apuzzo & Kerr, *The Canada-U.S. Free Trade Agreement: A Canadian Perspective*, 22 J. WORLD TRADE 9, 25 (1988).

[136] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 3; *see* McLachlan, Apuzzo & Kerr, *supra* note 135, at 6–14 (discussing the various types of contractual arrangements under which Canadian hydropower is sold).

[137] *See* Carson, *supra* note 77, at 268.

[138] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 75.

[139] For a complete discussion of the concerns raised by spokesmen of the coal lobby regarding substantial imports of Canadian hydroelectricity, see *id.* at 15–62. Basically, the coal lobby argues that Canadian hydroelectricity may be unreliable, that it is unfairly subsidized, and that it is subject to minimal Canadian environmental regulation. *Id.* The Lee, Foster, and Parson study refutes these allegations. *Id.*

There is substantial evidence that imports of Canadian hydroelectricity have been beneficial to United States consumers. Commentators describing the net economic benefit that the imports have provided to United States consumers have shown that United States consumers saved between $105 million and $137 million in 1986 for electricity generated by hydropower imports under interruptible power contracts.[140] They have also shown that United States utilities saved between $50 million and $275 million in 1986, under long term contracts.[141] These calculations present a convincing case that hydroelectric imports from Canada confer a substantial *economic* benefit on United States consumers. No attempt has been made to calculate the concurrent benefits to the United States *environment* that accrue from these imports.

It is clear, however, that sales of Canadian hydropower to United States markets also confer some environmental benefits on the United States. These benefits include the avoidance of resource depletion (to the extent that domestic resources would be consumed to generate electricity as a replacement for the imports), and the reduction of pollutants associated with the entire fuel cycles of domestic generation of electric power from various energy sources. In fact, to the extent that hydropower purchased from Canada confers this environmental benefit, it can be said that *imports* of Canadian power permit the United States to *export* some of its environmental problems. To that extent, the Canadian environment foots the bill for the conservation and protection of the United States environment. How high an environmental price Canadians are willing to pay remains to be seen as they face the prospects of expanding hydro facilities to accommodate an expanding United States market in future decades.[142]

As we have seen, imports of hydroelectricity from the excess capacity of existing Canadian hydro facilities have conferred significant economic and environmental benefits upon the United States. Similarly, sales of Canadian hydropower to the United States have offered environmental and economic advantages to Canada. Insofar as hydroelectricity displaces fossil fuel generation of electricity in the United States, it also reduces emissions of sulfur dioxide, nitrogen oxides, and particulates, and these reductions help to alleviate acid rain assaults upon the Canadian environment. Exports to the

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[140] *Id.* at 66–67, table 3.

[141] *Id.* at 70–72.

[142] *See infra* note 159 and accompanying text.

United States, in general, along with exports of excess hydroelectricity, in particular, have been vitally important to the Canadian economy. Exports to the United States constituted a primary motivation for Canada's ratification of the FTA. Canada's desire to play a competitive role in the global economic arena,[143] its dependence on exports to United States markets as an indispensable part of its foreign trade policy,[144] and its perception that a new wave of United States protectionism was imminent[145] all contributed to the Mulroney administration's decision to embark upon the FTA negotiation process. As the forecasts indicate, Canada can expect to enjoy increasingly appreciable revenues from the sale of hydroelectricity to United States markets under the provisions of the FTA.[146] While it is in Canada's best interests to have a market for its surplus hydroelectricity, it is not clear to what extent Canada will perceive it to be in its best interest to expand its capacity in order to accommodate the ever-increasing energy demands of the United States.[147]

In addition to the environmental/economic policy choices, Canadians will have to make choices concerning land use. There is a growing perception in the United States that its voracious appetite

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[143] *See* Quinn, *Federalism and Foreign Economic Relations*, 10 CANADA-U.S. L.J. 197, 197 (1985).

[144] *See* Watkins, *The Case Against United States-Canada Free Trade*, 10 CANADA-U.S. L.J. 89, 90 (1985).

[145] *Id.* at 89.

[146] *See* H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 74, 78–79.

[147] The requisite expansion of transmission line capacity alone presents certain problems and hazards. Transmission line capacity is already filled. Additional aboveground transmission lines require land, and this requirement raises significant political, environmental, and health concerns. *Id.* at 76. The cost of equivalent underground transmission line construction is, however, five to seven times more expensive than aboveground construction. *Id.* Moreover, transmission lines traverse areas not served by the energy they transport. *Id.* Therefore, local opposition on land use and environmental grounds is inevitable. In addition, because of the intensive capital investment necessary for transmission line construction, the facilities require "wheeling" and, therefore, some guarantee of equal access to intervening transmission facilities across national and state lines. "Wheeling" is the transportation of electricity from one facility to another that requires access to the electricity lines owned by a third facility. J. TOMAIN, J. HICHEY, & S. HOLLIS, ENERGY LAW AND POLICY 472 (1989). No attempt was made to deal with these crucial issues under the provisions of the FTA. *See* McLachlan, Apuzzo & Kerr, *supra* note 135, at 25. The only specific provision in the FTA relevant to the transmission problem was one that provided British Columbia Hydro with equal access to the Bonneville tie, but it did not prevent intervening state facilities from refusing to "wheel." *Id.* Thus, all Canadian suppliers of hydroelectricity are placed in an untenable position regarding long-term investments in additional transmission capacity. This substantial hazard to infrastructure investment, the risk of an inability to reach targeted United States markets, is not the only impediment to expansion of Canadian hydroelectric capacity for the purpose of serving United States needs. Rather it is merely symptomatic of larger resource and environmental issues also studiously avoided by the FTA.

for energy might be met by a menu of unlimited Canadian natural resources. So, for example, in response to the coal lobby's opposition to energy supplied by Canadian hydroelectric capacity, a study by Lee, Foster, and Parson comments, "[I]f the Canadian governments wish to consume their resources in order that United States households can enjoy lower-cost power, United States industries can reduce their electric bills and thus increase their competitiveness, and United States utilities can reduce their emissions of sulfur, particulates and NO_x while conserving capital . . . should the United States object?"[148] Relative to the energy resource alone, that study points out that Canada contains approximately twenty percent of the world's fresh water within rivers containing approximately ten percent of the total flow of the world's waterways.[149] Further, these rivers drain primarily into the north, an area that contains heretofore untapped sources of energy in unpopulated areas.[150] These areas are, thus, relatively unburdened by competing claims for the use of the resources and surrounding environment.

Statistics describing undeveloped hydropower resources as well as the description of even one existing hydropower complex—Hydro-Quebec's LG2 built in 1979—lends credence to the perception that Canada's hydroelectric resources are virtually unlimited.[151] From that vantage point it is easy to fall prey to the free trade doctrine that posits efficiency as the premier value. That doctrine has been espoused by both the Reagan and Bush administrations on the south side of the border.[152] The doctrine's perceived advantages of expanding productivity and investment, and improving economic efficiencies, are buttressed by substantial evidence that the flow of Canadian hydroelectricity under the FTA has been a net benefit to the United States. Similarly, on the north side of the border, proponents of the free trade doctrine can point with assurance to its indubitable contributions to Canada's export-driven economy.[153] The current energetic competition for market share among the provinces, dubbed "the civil war for foreign money,"[154] reinforces the notion

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[148] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 28.

[149] *Id.* at 1–2 (citing ENVIRONMENT CANADA, CANADA WATER YEARBOOK 1977–78, at 53 (1979)).

[150] *Id.*

[151] *See* J. GARREAU, THE NINE NATIONS OF NORTH AMERICA 362–65 (1981).

[152] *See* Merkin, *An Overview of the Prospects of Sectoral Integration: The View from the United States*, 10 CANADA-U.S. L.J. 13, 13 (1985) (Reagan); Rowan, *President Vows to Resist Calls for Managed Trade*, Wash. Post, Feb. 7, 1990, at D1, col. 5 (Bush).

[153] Quinn, *supra* note 143, at 197.

[154] Fry, *supra* note 99, at 175.

that the economic attributes of free trade are of preeminent concern. However, as was mentioned in a previous section of this paper, this conventional economic wisdom[155] is not without its detractors.

Critics would argue that an efficient reallocation of resources,[156] in solely economic terms, is merely the dominant priority of an industrial, political elite.[157] As Canada considers other impacts consequent to any decision to expand its hydroelectric capacity appreciably, these critics may play a pivotal role.[158] In the area of policy choices concerning environmental consequences of hydroelectric resources development and deployment, a policy choice conflict is imminent and apparent.[159]

The FTA, by its terms, made no effort to grapple with environmental problems emanating from projected expansion of Canadian hydroelectric capacity. The 1985 Report of the Royal Commission on the Economic Union and Development Prospects in Canada, which was published during negotiations leading to ratification of the FTA, states—with more hope than assurance—that there is "no ultimate conflict between economic development and the preservation and enhancement of a healthy environment and a sustainable

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[155] Hunter, *The Comparative Effects of Environmental Legislation in a North American Free Trade Area*, 12 CANADA-U.S. L.J. 271, 272 (1987).

[156] Thompson, *Reducing Barriers to Trade in Nontraded Goods and Services*, 10 CANADA-U.S. L.J. 35, 36 (1985).

[157] *See* Watkins, *supra* note 144, at 92.

[158] Political economists have argued that free trade between a predominantly natural resource economy (like Canada) and a predominantly industrial economy (like the United States) ultimately favors the industrial economy at the expense of the "hinterland" economy. This is so because the motivation of the hinterland to secure a market for its resources has the cumulative effect of, and tends to entrench the hinterland in, maintaining the hinterland's dependent position as a resource supplier. Any resolve to create a self-sufficient domestic economy through its own industrial development is diminished by this market-driven propensity. *See id.* at 92–95.

[159] Next year, Hydro-Quebec commences its Great Whale River project, which is a part of a plan to expand its hydroelectric facilities in the James Bay area. The project is designed to meet its burgeoning contractual requirements to accommodate United States energy needs in the northeastern United States. Existing facilities in the James Bay area already have flooded thousands of square miles of Cree Indian lands and destroyed natural bottomland flora and animals, especially caribou. The new project will not only eliminate additional Cree lands, but will also destroy habitat and breeding grounds of a wide variety of species, including freshwater seals, beluga whales, osprey, and bears. While the Cree and the Inuit were parties to a land claims settlement in 1975, which permitted Hydro-Quebec to develop the region for hydro capacity, these two groups, along with supporters from environmental organizations, have begun to rally opposition to the new project on both sides of the border. Estimates indicate that, if completed, the Great Whale River project will supply one-fourth of North America's hydroelectricity. Claiborne, *Canadian Indians Battle Massive Hydro Project*, Wash. Post, Apr. 3, 1990, at A12, col. 1.

resource base."[160] Thereupon, the Commission promulgated its "policy" that environmental concerns and economic growth were not incompatible.[161] While this approach is surely laudable, it offers little guidance in fashioning specific programs where real conflicts between development and the environment may arise.[162]

The emergence of competing claims to resource use and the environmental concerns of resource protection, in opposition to the economic momentum favoring expansion of Canadian hydroelectric capacity to serve United States energy needs, may in time be characterized as an issue over sovereignty, the recurring Canadian fear that economic ties with the United States will lead to a loss of political independence on policy issues that affect the United States.[163]

This underlying ambivalence toward trade with the United States[164]—the appeal of United States markets juxtaposed against the threat of United States domination—will take the form of a heartland-hinterland struggle between Ottawa and the provinces.[165] The water-rich provinces may view themselves as being situated at the wrong end of the political-economic food chain. In the ensuing scenario, the federal capital, the hub of the country's manufacturing and financial interests, will continue to push for a broader trade arrangement.[166] With regard to trade in hydroelectricity, as energy requirements of the United States encourage a substantial expansion of Canadian hydroelectric capacity, the water-rich provinces may view with alarm the proposed depletion and despoiling of their limited natural resources. It is fair to say that they will not acquiesce in the face of market and federal pressures. They have at their disposal real power of their own. They command a significant share of the legislative power under Canada's decentralized federalism.[167] In addition, the federal parties themselves are provincially based.[168]

In summary, the United States-Canada Free Trade Agreement is a conservative mechanism for improving trade relations between the

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[160] Hunter, *supra* note 155, at 271.

[161] *Id.*

[162] *See* H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 57.

[163] MacDonald, *An Overview of Prospects for Sectoral Integration: The View from Canada*, 10 CANADA-U.S. L.J. 3, 7 (1985).

[164] *Id.* at 4.

[165] Fry, *supra* note 99, at 177.

[166] Moull, *Natural Resources and Canadian Federalism: Reflections on a Turbulent Decade*, 25 OSGOODE HALL L.J. 423 (1987).

[167] Quinn, *supra* note 143, at 198.

[168] Fry, *supra* note 99, at 177.

two countries. Given the history of retaliatory protectionist policies between the United States and Canada, the FTA represents a significant step toward freer and more predictable trade relations. Analysts on both sides of the border hope that the Agreement also will ultimately facilitate mutually advantageous efficiencies within both economies, and that these will improve their respective positions in an increasingly competitive global market.

In the energy sector, Canadian supply of hydroelectricity to United States markets will increase under the auspices of the FTA. This is so because the bilateral trade in hydroelectricity serves the dual purpose of providing Canada with a profitable, accessible market for its excess production of electricity while simultaneously providing the United States with a pre-existing and available source of low-cost electricity to serve its expanding energy requirements.

Nevertheless, it should not be supposed that these market dynamics will result in an indefinite expansion of hydroelectric trade. Limitations eventually will be imposed by forces emanating from within Canadian society. In spite of some regional and industry-specific forces within the United States that oppose importation of Canadian hydropower, the United States will not curtail expansion of the hydroelectric trade because it affords the national economy a supply of energy that is inherently and significantly inexpensive, both economically and environmentally. Because Canadians are dependent upon United States markets for sales of their excess hydro capacity, they will continue to set prices so as to undercut United States domestic alternatives to Canadian hydroelectricity.[169]

On the other hand, as Canadians contemplate development of additional hydroelectric facilities and transmission capacity to feed the ever-growing United States appetite for energy, opposing forces will continue to emerge. Within the water-rich provinces, competing claims to hydro-related resources and environmentalists' interests, and traditional fears of United States imperialism will compel the implementation of policies limiting expansion of hydro capacity. They ultimately will serve to cap the exportation of hydroelectricity to United States markets.

Nevertheless, to the extent that Canadian hydroelectricity will displace electricity generated by United States fossil fuel energy, it will serve the important environmental goal of reducing emissions that contribute to acid rain on both sides of the border. Thus, while domestic politics within the United States have precluded bilateral

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[169] H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 18.

agreement on acid rain regulation, the play of market forces, under the auspices of the FTA, will act as a partial surrogate for "hard law" regulation.

C. A Perspective on Canada's Policy Trade-Offs

As we have seen, expanding hydro production provides a distinct economic advantage to an export-dependent economy like Canada's. Expanding sales of hydropower to United States markets also promises an environmental benefit, insofar as Canadian hydropower serves to displace energy generated from existing facilities in the United States Midwest that contribute substantially to the Canadian acid rain problem. But, as discussed above, hydro production is not environmentally benign. It precludes alternate uses of vast tracts of land that must be flooded to develop the facilities. It also destroys existing ecosystems and native habitat on the flooded land.

One method that may be helpful in measuring the real costs and benefits of development, in order to clarify the policy choices of expanding hydroelectric capacity, has been suggested by, among others, the World Resources Institute (WRI). Under traditional Keynsian accounting procedures of measuring a nation's economic well-being, gross national product (GNP), and "national income," natural resource deployment is treated as current income. This system, employed by all developed nations for macroeconomic growth, completely ignores the depletion and ecological destruction of natural resources associated with apparent economic growth. As WRI points out, the natural environment is, among other things, the resource pool from which all economic activity arises. Therefore, natural resources should be treated as productive tangible assets in national accounting procedures. Accordingly, the consumption or destruction of natural resources should be depreciated and deducted from the GNP.[170] With regard to the expansion of hydroelectric capacity in Canada, for example, account should be made for the loss of millions of acres of land, timber, and habitat displaced by reservoirs associated with the construction of hydroelectric facilities. So, too, should these considerations be factored into macroeconomic projections of cost per unit of power produced.

While these accounting procedures would lend clarity to calculations concerning the actual cost of hydroelectric expansion, the policy choices will still have to be made. In that regard, non-economic

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[170] *See* Repetto, *No Accounting for Pollution*, Wash. Post, May 28, 1989, at B6, cols. 3–6.

policies as well as cost consideration will be brought to bear. For example, while development of additional hydroelectric facilities may proceed apace in some unpopulated, rugged areas that are part of the "Canadian Shield," there is already growing political opposition to expanding capacity, not only in Cree Territory in Quebec, but also in the province of British Columbia, where most suitable locations for additional facilities are located within arable valleys.[171] There, competing claims to the resources may block or inhibit future development of hydroelectricity beyond the amount needed to serve local markets.

V. THE USE OF FREE TRADE MECHANISMS AS SUBSTITUTES FOR REGULATION OF TRANSBOUNDARY POLLUTION

The problem of the transmission of acid rain pollutants from the United States to Canada illustrates the dilemma over management of resources held in common that Hardin characterized as the "Tragedy of the Commons."[172] Hardin explained how "common-property"[173] resource degradation occurs, by employing a hypothetical involving herdsmen and an open pasture.[174] As each herdsman

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[171] *See* H. LEE, N. FOSTER & E. PARSON, *supra* note 85, at 57.

[172] *See* Hardin, *supra* note 5.

[173] Berkes, Feeny, McCay & Ackerson, *The Benefit of the Commons*, NATURE, July 13, 1989, at 91.

[174] The text of the hypothetical is as follows:

> The tragedy of the commons develops in this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work satisfactorily for centuries because tribal wars, poaching and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.
>
> As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to *me* of adding one more animal to my herd?" This utility has one negative and one positive component.
>
> 1. The positive component is a function of an increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.
>
> 2. The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decisionmaking herdsman is only a fraction of -1.
>
> Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is

pursued his self-interest by increasing the size of his own herd, the carrying capacity of the pasture was finally exceeded and the pasture—the commons—was destroyed by over-grazing. As Hardin pointed out, where the problem is one of pollution, the situation is somewhat reversed.[175]

In the case of transboundary acid rain, for example, Midwest utilities and industries that burn fossil fuels (and in particular, high sulphur coal) were faced with the necessity of complying with the United States Clean Air Act. Rather than investing in expensive pollution-abating technologies, they found it to be in their best interests (cheaper and, therefore, more profitable) to construct tall stacks that propelled emissions into the atmosphere, where they were carried away from the immediate vicinity and—thereby—avoided detection by governmental monitors.[176]

The result, acid rain in southeastern Canada and the northeastern United States, was thus a problem of "externalities."[177] Like the herdsman whose additional cattle are a "positive component"[178] to his profit but a "negative component"[179] to the commons of the pasture, the tall stacks had the profitable effect (positive component) of permitting the Midwest facilities to export the expense-inducing emissions to the commons of the atmosphere, and thence, to the ecosystems upon which they eventually fell (the negative component).[180]

Hardin averred that, as to the commons of air and water (where privatization is impossible), the only effective devices for protecting them from this degradation are coercive laws or taxing techniques that "make it cheaper for the polluter to treat his pollutants than to

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> limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Hardin, *supra* note 5, at 1244.

[175] "Here it is not a question of taking something out of the commons, but of putting something in . . . ." *Id.* at 1245.

[176] *See supra* notes 69–76 and accompanying text.

[177] Economists dub those effects that are not directly involved in the production or use of a commodity (private costs), "externalities." *See* R. LIPSEY & P. STEINER, ECONOMICS 225 (3d ed. 1972).

[178] *See* Hardin, *supra* note 5, at 1244.

[179] *Id.*

[180] Hardin described this phenomenon when he stated, "The rational man finds that his share of the cost of the wastes he discharges into the commons is less than the cost of purifying his wastes before releasing them." *Id.* at 5. The situation is analogous to the model known as the "prisoner's dilemma," which describes the factors that influence decisionmaking. *See, e.g.*, GOETZ, LAW AND ECONOMICS 8–18 (1982).

discharge them untreated."[181] As Hahn and Richards have pointed out, domestic laws alone have been inadequate to deal with transboundary pollution and the degradation of the global commons. This inadequacy has inspired the "internationalization" of environmental laws.[182] However, some analysts have argued that privatization and governmental regulation are not the only effective techniques for averting commons degradation.

One proposed alternative is that of communality, where the users of the commons employ self-regulating techniques.[183] As advocates of this approach have indicated, communality works when historical and cultural perceptions encourage resource management of a commons through social pressure and a spirit of cooperation.[184]

Another approach that has been espoused is inspired by the insights of Ronald Coase.[185] Coase argued that legal imposition of compensatory liability on the polluter was not the most efficacious solution to the problem. Rather, he said, in the absence of high transaction costs (the costs entailed in consummating a business transaction), the preferred, most efficient solution is to permit the offending and offended private parties to reach a mutually satisfactory bargain about the allocation of cost and resource use.[186]

Which solution best fits the problem of transboundary acid rain between Canada and the United States? For purposes of this analysis it will be assumed that each of the approaches identified above can make a significant contribution given the proper context.[187] This writer believes that ideological or normative stances on any side of the issue are counter-productive and can lead to the anomaly that Ida Hoos characterized as the situation of a drunk looking for his wallet under a street light, not because he lost it there, but because

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[181] Hardin, *supra* note 5, at 1245.

[182] Hahn & Richards, *supra* note 2, at 421.

[183] *Benefit of the Commons*, *supra* note 173, at 92, 93. Through the use of case studies, the authors show that, in the proper situation, communality can be even more effective than governmental regulation. *See id.* at 91–93. They define a commons as a media or resource where control of access is difficult or impossible and where the use of the resource by one detracts from its general use, so that individual and social interests are potentially at odds. *Id.* at 91.

[184] *See id.* at 91–93.

[185] *See* Coase, *supra* note 6, at 1.

[186] *See id.* at 4, 5.

[187] An analysis of the validity of what has come to be known as the Law and Economics approach to environmental policy is well beyond the scope of this article. Suffice it to say that both its proponents and its detractors are legion. A basic text in support of the approach is B. ACKERMAN & W. HASSLER, CLEAN COAL/DIRTY AIR (1981) (asserting that command and control regulations are inefficient). For a contrary view, see Sagoff, *Economic Theory and Environmental Law*, 79 MICH. L. REV. 1393 (1981).

the light made his search easier there.[188] Looking under *each* street light, or policy position, identified above, then, we can see first that Hardin's coercive law approach has been inapplicable. Unlike the ozone depletion problem that eventually resulted in the command-and-control[189] regulatory regime for the Montreal Protocol, the United States-Canada acid rain problem has not yet proved amenable to a regulatory solution.

As previous sections of this Article explained, the acid rain problem has lacked the requisite United States domestic political support that is pivotal in reaching agreement on bilateral regulation.[190] More to the point, the Midwest coal lobby has proved to have sufficient power or clout to preclude a bilateral agreement.[191] In any case, lacking peculiar circumstances that marshalled sufficient domestic support for the Montreal Protocol, the acid rain problem has not been amenable to a bilateral regulatory solution.[192]

Similarly, a communality approach to the problem is not available. As indicated above, that solution requires sufficient cultural and historical bases that give rise to shared perceptions and values about the benefits that accrue to all by protection of the commons. Without these, the leverage of social pressure is unavailable. If transboundary environmental law is in its infancy, then a spirit of transboundary communality or communitarianism must surely be in its nascency. Until that spirit has reached a higher level of development, communitarian extortions like Principle 21[193] and the Memorandum of Intent,[194] without hard law to give them substance, will exert only minimal pressure, at best, on societal behavior.

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[188] Lovins, *Cost-Risk-Benefit Assessments in Energy Policy*, 45 GEO. WASH. L. REV. 911, 912 (1977) (citing I. Hoos, The Assessment of Methodologies for Nuclear Waste Management (1976) (transcript)).

[189] Stewart, *Regulation, Innovation and Administrative Law: A Conceptual Framework*, 69 CALIF. L. REV. 1259, 1264 (1981). Command-and-control regimes have been defined as "measures that require or proscribe specific conduct by regulated firms." *Id.*

[190] *See supra* note 4 and accompanying text.

[191] This suggests that the situation is illustrative of public choice theory. For a discussion of that theory, see generally Farber & Frickey, *The Jurisprudence of Public Choice*, 65 TEX. L. REV. 873 (1987).

[192] *See* Montreal Protocol, *supra* note 1, art. 8, *reprinted in* 26 I.L.M. at 1556. Additionally, as the avoidance of emission limitations by use of tall stacks illustrates and public policy theory suggests, the vulnerability of governmental resolve to the pressures of special interests, at both the legislative enactment and agency enforcement stages, mean that enforcement itself may be problematic. *See generally id.* If this is true at the domestic level, where the power to enforce is unquestionably available, it must be a dominant concern in bilateral or multinational arrangements, where the means to enforce are, at best, severely limited.

[193] Stockholm Declaration, *supra* note 1, *reprinted in* 11 I.L.M. at 1420.

[194] *See* Memorandum of Intent, *supra* note 85.

Coase's Theorem offers another approach. As we have seen, the United States-Canada Free Trade Agreement avoided the acid rain problem entirely. However, by improving the predictability and stability of bilateral trade in hydroelectricity, the FTA encourages increased trade in that energy source. Because hydroelectricity is inherently cheaper than fossil fuel alternatives and because the price differential favoring hydroelectricity can be predicted to increase as United States Clean Air amendments rachet down emission limits, it can be anticipated that Canadian hydroelectricity will, to some extent, displace energy generated by United States facilities whose emissions contribute to acid rain. Thus, abatement of the acid rain problem, which eluded resolution during the FTA negotiations, will be achieved partially under its auspices through the bargaining of private parties. This variant of Coase's Theorem, the use of a free trade agreement, can be seen as a technique to facilitate curtailment of transboundary pollution.

VI. Conclusion

Growing awareness of the destructive effects of transboundary pollution has created a trend toward internationalization of environmental law. Because of its success in establishing a regulatory system for control of ozone-depleting substances, the Montreal Protocol is widely acclaimed as a prototype for control of other kinds of transboundary pollution. However, unique scientific and technological circumstances surrounded the formation and ratification of the Montreal Protocol. These circumstances may be conspicuously absent from other transboundary or global commons pollution situations. Lacking the assistance of these circumstances, proponents of bilateral and multilateral agreements may be unable to garner the requisite domestic political support for pollutant regulation. Therefore, the use of the Montreal Protocol as a prototype may be limited.

The United States-Canada FTA offers the most obvious case for using transboundary market mechanisms as a "bribe" to discourage behavior that creates transboundary pollution. The two countries are contiguous, and Canada has an abundant energy resource with which to bribe the United States market. Nevertheless, the applicability of transboundary market mechanisms is not limited to the United States/Canada situation. Any resource, not necessarily an energy resource, that, when marketed in the polluting country, undercuts the price of products or industries that are environmentally more destructive will induce pollution abatement. The trick is simply

to make activities that generate the offending pollutants more expensive than relatively benign alternatives that are made available through bilateral markets. Trade agreements can encourage this phenomenon by a judicious and selective elimination of trade barriers.

Just as the latter half of the twentieth century has witnessed a distinct trend toward bilateral and multilateral environmental law, it has also been witness to the proliferation of free trade agreements between nations.[195] When the option of a hard law regulatory system is foreclosed, a free trade agreement like the FTA occasionally may act as an effective alternative to a regulatory approach by facilitating environmentally benign behavior through the operation of the marketplace.[196]

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[195] The 1992 European Community (EC) and the United States-Canada Free Trade Agreement are examples of this phenomenon. The FTA is only the second free trade agreement to which the United States was a party—the first was with Israel—but negotiations already are underway for the formation of a free trade agreement with Mexico and even a free trade zone encompassing the Western Hemisphere. Auerbach, *Bush Offers Proposals to Lower Latin Debt*, Wash. Post, June 28, 1990, at C1, col. 4 (concerning free trade zone in the Western Hemisphere).

[196] Regarding the confederation crisis in Canada, Prime Minister Mulroney has declared a moratorium on the constitutional debate until the fall of 1990. Claiborne, *Despite Pact Failure, Precipitous Breakup of Canada Unlikely*, Wash. Post, June 26, 1990, at A15, col. 1. In any case, it is predicted that an economic unity of the country will endure. *Id.*