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# A Moralistic Approach to the Ozone Depletion Crisis

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## COMMENTS

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#### I. INTRODUCTION

We stand in an era of psychological evolution. This development of perception and thought includes a shift from the desire to dominate our surroundings towards the desire to accommodate them. Cultural imperatives based on fear of the wild once dictated that "[i]f men expected to enjoy an idyllic environment . . . they would have to make it by conquering wild country."<sup>1</sup> Contrarily, the realization that "man has become the greatest threat to his

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1. R. NASH, *WILDERNESS AND THE AMERICAN MIND* 26 (3d ed. 1982) (tracing the development of American sentiment regarding wilderness and the environment).

own survival and development"<sup>2</sup> colors most contemporary environmental theory with refreshing hues of human restraint.<sup>3</sup> Certainly, then, popular perceptions of the environment have matured since the time when Lewis Cass, a Michigan soldier and Senator, declared: "[t]here can be no doubt that the Creator intended the earth should be reclaimed from a state of nature and cultivated."<sup>4</sup>

On September 16, 1987, by adopting the Montreal Protocol on Substances That Deplete the Ozone Layer (the "Montreal Protocol" or the "Protocol"),<sup>5</sup> the international community added another multilateral agreement to the growing number of international documents which manifest this change in the approach to global environmental problems. The Montreal Protocol seeks to protect our ecosystem from the effects of ozone depletion by call-

2. L. CALDWELL, IN DEFENSE OF EARTH 225 (1972) (setting forth the paradox that man is the most serious threat to his own existence).

3. See generally *id.* Existentialist philosopher and playwright Jean Paul Sartre expounded on this same view in a broader sense. In his play, *The Condemned of Altona*, Sartre delivered his version of the verdict of history through his character Franz. Franz stated, "The century might have been a good one had not man been watched from time immemorial by the cruel enemy who had sworn to destroy him, that hairless, evil, flesh-eating beast—man himself." J. SARTRE, *THE CONDEMNED OF ALTONA* 177 (S. Leeson & G. Leeson trans. 1960).

4. Cass, *Removal of the Indians*, 30 N. AM. REV. 62, 77 (1830). A statement made during the same year by Georgia Governor George R. Gilmer perhaps more accurately reflects the attitude that wilderness was ripe for exploitation. He justified this domineering attitude by citing the "command of the Creator, delivered to man upon his formation—be fruitful, multiply, and replenish the earth, and subdue it." R. NASH, *supra* note 1, at 31. Some current commentators reflect this view. According to one, everything good depends on beating back and holding at bay the wilderness both in nature and the human heart. Wernick, *Speaking Out: Let's Spoil the Wilderness*, SATURDAY EVENING POST, Nov. 6, 1965, at 12. See also A. MAY, *VOICE IN THE WILDERNESS* (1978) in which the author writes about the wilderness movement and wilderness organizations as well as what the author deems "the grotesque irony of wilderness being destroyed by its own protection." *Id.* at 1.

Nothing inherent in the development of civilization required such an exploitative attitude. For example, the Chinese Taoists, drawing on their agrarian history, idealize nature, and by extension, the environment. For Taoists, nature is the source of all human happiness, while man is the source of all human suffering. FUNG YU LAN, *A SHORT HISTORY OF CHINESE PHILOSOPHY* 20-21 (1948).

5. Montreal Protocol on Substances That Deplete the Ozone Layer, Sept. 16, 1987, reprinted in 26 I.L.M. 1550 [hereinafter Montreal Protocol]. The Montreal Protocol seeks to regulate the production and consumption of chemicals which deplete the ozone layer. The following forty-seven countries signed the Final Act of the Montreal Protocol: Argentina, Australia, Austria, Belgium, Brazil, Burkina Faso, Byelorussian SSR, Canada, Chile, China, Congo, Democratic Yemen, Denmark, Egypt, Federal Republic of Germany, Finland, France, Ghana, Indonesia, Israel, Italy, Japan, Kenya, Malaysia, Mauritius, Mexico, Netherlands, New Zealand, Nigeria, Norway, Panama, Peru, Philippines, Portugal, Republic of Korea, Senegal, Sweden, Switzerland, Thailand, Togo, Uganda, Ukrainian SSR, Union of Soviet Socialist Republics, United Kingdom, United States, and the European Economic Community.

ing for global regulation of the chemicals which decimate the ozone and expose our delicate environment to harmful solar radiation.<sup>6</sup> This article analyzes the Protocol and its potential for success. Part II sets forth basic scientific information required to understand the nature of the crisis and briefly explains the crucial provisions of the Protocol. Part III addresses the quintessential problem of all international agreements, namely, enforcement. It is argued here that the economic and political consequences of the Protocol leave the current version of the agreement unenforceable. However, as a deeper reflection of our developing environmental consciousness, this article suggests the recategorization of the ozone crisis as a moral rather than economic problem. Once cast as a moral issue, the international community may more willingly seek criminal instead of economic enforcement means. Finally, this article concludes that with the continuing maturation of our environmental psychology, the global community may effectively enforce international environmental law with criminal sanctions based upon moral imperatives, rather than with fiscal incentives based upon economic power.

## II. THE CRISIS AND CURRENT RESPONSE TO THE OZONE DEPLETION PROBLEM

A proper understanding of the Protocol and its limitations requires a brief investigation into the scientific information which precipitated the agreement. To this end, the first part of this section explains the function and composition of the ozone layer and discusses the probable causes and effects of its diminution. Following this discussion, the second part of this section sets forth the current response to the ozone depletion crisis by redacting key portions of the Montreal Protocol.

### A. *The Ozone Crisis*

Ozone (O<sub>3</sub>) refers to unstable three part oxygen molecules,<sup>7</sup> which comprise a deep, though sparse, belt of atmospheric gas.<sup>8</sup>

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6. *Id.* at 1551.

7. See Johnston, *Systemic Environmental Damage: The Challenge to International Law and Organization*, 12 SYRACUSE J. INT'L L. & COM. 255, 263 (1985); Comment, *The Problem of Ozone Depletion—Is There an International Legal Solution?*, 12 N.C.J. INT'L L. & COM. REG. 433, 434 (1987).

8. Comment, *The Montreal Protocol: Confronting the Threat to Earth's Ozone Layer*,

Ozone is perhaps the most important trace constituent of the stratosphere,<sup>9</sup> for it is responsible for shielding the earth from harmful solar ultraviolet radiation.<sup>10</sup> As the ozone layer diminishes, greater concentrations of damaging radiation reach the earth's surface.<sup>11</sup>

Until recently, scientists based fears of ozone layer destruction more upon theoretical predictions than upon exacting observations.<sup>12</sup> However, the National Aeronautics and Space Administration's (NASA) deployment of sophisticated satellites partially confirmed the scientists' theoretical forecasts.<sup>13</sup> Analysis of data collected from the NASA satellites indicated global ozone decreased approximately 0.15 percent each year from 1970 to 1981, an annual ozone depletion of 0.5 percent between 1978 to 1984, and seasonal depletion in some areas (especially Antarctica) as high as sixty percent.<sup>14</sup> Information collected by field scientists in Switzerland, Germany, Canada, and Antarctica supports the satellite data.<sup>15</sup> Additionally, the National Oceanic and Atmospheric Administration (NOAA) compiled and synthesized available ozone information and calculated that during the first half of 1983 ozone concentrations over the Northern Hemisphere dropped between five and seven percent.<sup>16</sup> Now, with the revelation of this evidence, scientists, policy makers, and even industrialists agree that the ozone buffer is rapidly weakening due to increased concentrations of chlorofluorocarbons in the atmosphere.<sup>17</sup>

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63 WASH. L. REV. 997, 997 (1988) [hereinafter *Confronting the Threat*]. To be more precise, ozone is present from the troposphere (roughly ground level to 10 miles above the earth's surface) to the outer limit of the stratosphere (approximately 30 miles above the earth's surface). Comment, *supra* note 7.

9. Johnston, *supra* note 7.

10. Monastersky, *Decline of the CFC Empire*, SCI. NEWS, Apr. 9, 1988, at 234; Johnston, *supra* note 7; *Confronting the Threat*, *supra* note 8.

11. Shabecoff, *Study Shows Significant Decline in Ozone Layer*, N.Y. TIMES, Mar. 16, 1988, at A25, col. 1.

12. See Comment, *supra* note 7; Weisburd, *Stratospheric Ozone: A New Policy Tone*, SCI. NEWS, June 18, 1986, at 404. For a discussion tracing ozone observation methodologies, see Brodeur, *Annals of Chemistry: In the Face of Doubt*, NEW YORKER, June 9, 1986, at 71-72.

13. The theories were only partially confirmed because they correctly forecasted ozone depletion. Unfortunately, the data from the Nimbus-4 and Nimbus-7 satellites evinced a far more rapid and severe depletion than scientists presaged. See Comment, *supra* note 7, at 434-35.

14. Comment, *supra* note 7, at 434-35.

15. See Brodeur, *supra* note 12, at 70-72.

16. Brodeur, *supra* note 12, at 82.

17. Monastersky, *supra* note 10. According to Monastersky, DuPont, the world's leading producer of ozone-harming chemicals, agreed with an international panel of scientists that the global ozone layer was disappearing at an unexpectedly fast rate. As a result, Du-

## 1. The Causes of Ozone Depletion

Approximately seventy percent of ozone destruction is attributable to a natural catalytic cycle involving nitric oxide and nitric dioxide.<sup>18</sup> Scientists ascribe the remaining thirty percent impairment to human activities, including consumption of versatile industrial chemicals known as chlorofluorocarbons (CFCs).<sup>19</sup> Production and consumption of these compounds cause massive quantities of CFCs to enter the atmosphere.<sup>20</sup>

Once in the atmosphere, shortwave radiation from the sun breaks chlorine atoms away from the CFC molecules.<sup>21</sup> Free chlorine atoms react with unstable ozone molecule, attracting ozone's third oxygen atom, decomposing the ozone molecule into a more stable, though less protective, common oxygen (O<sub>2</sub>) molecule and a chlorine monoxide radical (ClO).<sup>22</sup> When the molecule of chlorine

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Pont shocked industry when it jumped on "the environmental bandwagon" announcing its support for plans to strengthen the Montreal Protocol and calling for a total world-wide ban on production of chemicals harmful to the ozone layer. *Id.*

The DuPont position, which represents industry's recognition of ozone dissipation, underscores the severity of the ozone problem especially given industry's general refusal to alter its lobbying position against regulation of ozone-harming chemicals without *absolute* proof of the deterioration and *absolute* proof of the causal connection between the chemicals and the ozone dissolution. Brodeur, *supra* note 12, at 83; Hoppe, *Ozone: Industry is Getting its Head Out of the Clouds*, Bus. Wk., Oct. 13, 1986, at 110.

It should be noted that a small fringe of the scientific community remains unpersuaded by the new evidence of ozone depletion. This intransigence stems from a perceived inability to mesh the ozone deterioration theory with current knowledge of the ozone layer. Specifically, dissenters call attention to the equilibrium nature of ozone in the layer. They postulate that the amount of ozone in the atmosphere depends on a balance between the processes of natural ozone production and destruction (through the short wavelengths of ultraviolet light from the sun). This balance varies markedly over the globe and throughout the year. Pease, *Ozone Chicken Littles Are at It Again*, Wall St. J., Mar. 23, 1989, at A24, col. 15.

18. Johnston, *supra* note 7, at 263.

19. Comment, *supra* note 7, at 436-38; accord Naj, *Chemical Reaction Helps to Explain Ozone Depletion*, Wall St. J., Apr. 12, 1989, at B4, col. 3; *Confronting the Threat*, *supra* note 8, at 997-1000. Specific chemicals targeted by the Montreal Protocol as most harmful to the ozone are the following CFCs and halons: CFC1<sub>3</sub> (CFC-11), CF<sub>2</sub>Cl<sub>2</sub> (CFC-12), C<sub>2</sub>F<sub>3</sub>Cl<sub>3</sub> (CFC-113), C<sub>2</sub>F<sub>4</sub>Cl<sub>2</sub> (CFC-114), C<sub>2</sub>F<sub>5</sub>Cl (CFC-115), CF<sub>2</sub>BrCl (halon-1211), CF<sub>3</sub>Br (halon-1301), and C<sub>2</sub>F<sub>4</sub>Br<sub>2</sub> (halon-2402). Montreal Protocol, *supra* note 5, annex A.

20. In fact, more than 35 million tons of CFCs currently circulate in the atmosphere. UNITED NATIONS ENVIRONMENT PROGRAMME, 1 N. AM. NEWS 2 (Dec. 1986); see also Comment, *The Montreal Protocol: Confronting the Threat to the Earth's Ozone Layer*, 63 WASH. L. REV. 997, 999 n.17 (1988).

21. The process by which short wavelength ultraviolet light from the sun decomposes CFC (as well as any other molecule) is scientifically termed photolysis. See Brodeur, *supra* note 12, at 72.

22. Lemonick, *The Heat is On*, TIME, Oct. 19, 1987, at 58, 60.

monoxide confronts a free oxygen atom, a new oxygen molecule ( $O_2$ ) and a chlorine radical (Cl) are formed. This process triggers a chain reaction in which one free chlorine atom and the numerous reactions it catalyzes can destroy 100,000 ozone molecules.<sup>23</sup> Thus, the annual release of approximately one million tons of CFCs into the atmosphere, in conjunction with the enormous destructive capacity of each chlorine atom, accounts in large part for most global ozone depletion.

CFCs have permeated almost all aspects of modern life. Despite their adverse environmental effects, CFCs are industrially ideal because they are nontoxic, nonflammable, versatile, and economical chemicals.<sup>24</sup> They are commonly employed in the manufacture of foams, coolants, packaging, insulation, and propellants.<sup>25</sup> In the United States alone, more than \$135 billion worth of products rely, in one form or another, on chlorofluorocarbons.<sup>26</sup> The production of this large volume of goods relying on CFCs effectively has created a society dependent upon the availability of CFCs. Yet, with the realization that CFCs destroy ozone, industrial scientists quickly emphasized the nonexistence of any chemical which could replace CFCs in the market.<sup>27</sup> While large corporations throughout the world frantically invested millions in research and development for substitute chemicals,<sup>28</sup> an inexpensive alternative to CFCs remains undiscovered.

## 2. The Effects of Ozone Depletion

In truth, the process of ozone destruction poses a cataclysmic

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23. *Confronting the Threat*, *supra* note 8, at 1000. The ability of CFCs to travel enormous distances in the atmosphere highlights the international aspect of the ozone crisis. As one noted professor of atmospheric chemistry, F. Sherwood Rowland, stated:

chlorofluorocarbon molecules, no matter where they are released, disperse very quickly throughout the atmosphere, and that emission in Europe, say, will sweep across Asia and the Pacific and reach the California coast in about a month. . . .

The damage now being inflicted upon the ozone layer above the United States . . . is cumulative damage caused by chlorofluorocarbons that have been released throughout the world.

Brodeur, *supra* note 12, at 80.

24. Koenig, *Search for Substitutes for Refrigerants Shows Some Progress but Has Far to Go*, *Wall St. J.*, Mar. 28, 1988, at 6A, col. 1.

25. For a useful chart listing the most widely used CFCs and halons, their ozone depletion potential, and U.S. and worldwide uses, see Monastersky, *supra* note 10, at 235.

26. *Confronting the Threat*, *supra* note 8, at 999.

27. *Id.*

28. Hoppe, *supra* note 17, at 111.

threat to all nations. The potential effects of ozone depletion and the concomitant exposure to higher concentrations of ultraviolet radiation range from minor eye injury to a diminished global food supply.<sup>29</sup> As a result, the health of humans will most certainly feel harsh immediate consequences. For example, increased exposure to radiation will result in approximately 153 million more non-melanoma skin cancer cases among people alive today or born prior to 2075.<sup>30</sup> Further, the increased UV-B radiation may impair human immune systems, thus weakening the capacity to fight disease.<sup>31</sup>

Famine caused by crop and animal exposure to higher concentrations of radiation will exacerbate these human health problems. As early as 1976, even before accurate data regarding the scope and extent of damage to the ozone, the National Academy of Sciences warned that the higher concentrations of solar radiation reaching earth's surface could have devastating consequences for the world's food supply by lowering crop yields and destroying microorganisms that form the foundation of the food chain.<sup>32</sup> The Academy's conclusion is buttressed by data regarding the known vulnerability to ultraviolet radiation of approximately seventy-five percent of the 200 major food crops,<sup>33</sup> and almost all species of marine microorganisms.<sup>34</sup> Finally, the vulnerable plankton population plays an important role in regulating climactic change by converting carbon dioxide. The devastating effects of increased radiation on these microorganisms caused by ozone depletion accounts for thirty percent of the greenhouse effect.<sup>35</sup>

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29. *Confronting the Threat*, *supra* note 8, at 998-1001; Comment, *supra* note 7, at 439.

30. Environmental Protection Agency, Protection of Stratospheric Ozone, 52 Fed. Reg. 47,289, 47,494 (1987) (codified at 40 C.F.R. §§ 82.1-.20 (1989)). Indeed, about 3 million of these cases could be fatal. *Id.* See also Beck & Hager, *More Bad News for the Planet: A Grim Report on the Ozone*, NEWSWEEK, Mar. 28, 1988, at 63.

31. *Confronting the Threat*, *supra* note 8, at 998 n.8.

32. See NATIONAL ACADEMY OF SCIENCES, OZONE AND OTHER PHOTOCHEMICAL OXIDANTS (1977); Brodeur, *supra* note 12, at 76.

33. Hoppe, *supra* note 17, at 114; Comment, *supra* note 7, at 439.

34. Many commercially and nutritionally important species of marine life, such as shrimp and crab, develop from these vulnerable microorganisms. The increased exposure to ultraviolet radiation allowed by diminishing ozone concentration could directly remove these species from the human diet (and the diet of other species) by killing them in their larval state. Moreover, when radiation eradicates a species at the bottom of the food chain, species higher in the food web have nothing upon which to feed. Thus, destruction of the microorganisms, while not immediately detrimental to human health, would have dire consequences when the fish, so vital a human food source, perish.

35. See *Nightline: The London Conference on Ozone Depletion* (ABC television broadcast, Mar. 7, 1987). For an overview of scientists' views that the forecasts of global warming are exaggerated and computer models on which they are based are flawed, see Stevens,



B. *The Current International Response to the Ozone Crisis*

To date, the Montreal Protocol represents the international community's firmest reaction to the growing concern over the decimation of the ozone layer.<sup>36</sup> Analysis of the Protocol reveals a four-pronged approach to ozone protection. Primarily, the Protocol requires parties to freeze, and eventually reduce, production and consumption of CFCs.<sup>37</sup> Article 2 of the Protocol sets forth the control measures on production and consumption contemplated by the parties.<sup>38</sup> It calls for an immediate freeze, and provides a schedule for the reduction, aiming for a fifty percent abatement in consumption by 1999.<sup>39</sup> However, each section of the Article 2 schedule contains a clause allowing up to ten percent annual increases of production, based on the 1986 level, for "basic domestic needs" and "industrial rationalization."<sup>40</sup>

Second, in order that these control measures accurately reflect the seriousness of the crisis, Article 6 of the Protocol provides for

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*Skeptics are Challenging Dire 'Greenhouse' Views*, N.Y. Times, Dec. 13, 1989, at A1, col. 1.

36. Negotiations for international ozone protection commenced in 1981 under the auspices of the United Nations Environment Programme. *Confronting the Threat*, *supra* note 8, at 1002. As a result, on March 22, 1985 twenty-one countries and the European Economic Community adopted the Convention for the Protection of the Ozone Layer in Vienna, Austria. The United States ratified the Convention in August, 1986. See SEN. TREATY DOC. NO. 100-10 (1986)[hereinafter Vienna Convention]. The Vienna Convention provided the framework for further negotiations including international cooperation in ozone research and the adoption of international regulatory measures of substances detrimental to the ozone layer. *Confronting the Threat*, *supra* note 8, at 1002. The Montreal Protocol, signed by 47 participants including many less developed countries, is an embodiment of the principles set forth in the Vienna Convention. The Resolution on the Montreal Protocol, which was appended to the Final Act, specifically recalled the Vienna Convention for the Protection of the Ozone Layer and bore in mind the Resolution of the Conference of Plenipotentiaries on the Protection of the Ozone Layer which beseeched "all States and regional economic integration organizations, pending entry into force of a protocol, to control their emissions of CFCs, *inter alia* in aerosols, by any means at their disposal, including controls on production or use, to the maximum extent possible." Resolution on the Montreal Protocol, *reprinted in* 26 I.L.M. 1547 (1987).

37. See Montreal Protocol, *supra* note 5, art. 2.

38. *Id.*

39. *Id.* para. 4.

40. *Id.* art. 2. The Protocol defines "industrial rationalization" as "the transfer of all or a portion of the calculated level of production of one Party to another, for the purpose of achieving economic efficiencies or responding to anticipated shortfalls in supply as a result of plant closures." *Id.* art. 1, para. 8. A definition of "domestic needs," however, remains conspicuously absent from the Protocol. Thus, the very terms of the Protocol provide a convenient loophole to escape the consequences of non-compliance. Of course, the drafters of the agreement may have intentionally framed the control provisions in ambiguous terms in order to entice more sovereign countries to join.

periodic reassessment of the control measures provided for in Article 2 using available scientific, environmental, technical, and economic information, beginning in 1990 and at least every four years thereafter.<sup>41</sup> This article calls for the parties to convene panels of experts at least one year before each assessment. Further, within one year of being convened, the panels will report their findings through the Secretariat to the parties.<sup>42</sup> Based on these assessments, the parties will renegotiate control measures, adjusting levels of production and consumption and adding new substances to the list of chemicals regulated by the Protocol.

Third, recognizing the "special situation of developing countries,"<sup>43</sup> the Protocol entitles less developed countries to a ten year delayed compliance with the control measures in Paragraphs 1 to 4 of Article 2 in order to meet their basic domestic needs.<sup>44</sup> Moreover, the Protocol requires the parties to the Protocol that are the more developed countries to offer assistance and access to less developed countries in finding and implementing alternative substances and technologies.<sup>45</sup> The terms of the agreement suggest that much of this assistance take the form of special incentives from the developed countries (bilaterally and multilaterally), including subsidies, aid, credits, guarantees, and insurance policies.<sup>46</sup>

Finally, in order to encourage more countries to sign the agreement, the Protocol imposes restrictions on trade of ozone-depleting products.<sup>47</sup> The agreement bans imports of CFCs from any state not party to the Protocol.<sup>48</sup> No party operating under Paragraph 1 of Article 5 may export CFCs to non-parties beginning January 1, 1993.<sup>49</sup> Moreover, the Protocol allows objecting parties to escape the ban on imports of products later found to be detrimental to the ozone.<sup>50</sup>

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41. *Id.* art. 2.

42. *Id.* art. 6.

43. *Id.* art. 5.

44. *Id.* art. 5, para. 1. The special provisions for developing countries reflect the broad international consensus that less developed countries deserve the benefits of consumer items and industrial processes which currently require CFCs. *Confronting the Threat*, *supra* note 8, at 1005.

45. Montreal Protocol, *supra* note 5, art. 5, para. 2.

46. *Id.* art. 5, para. 3; *see also id.* art. 10 (technical assistance provision).

47. *Id.* art. 4.

48. *Id.* art. 4, para. 1.

49. *Id.* art. 4, para. 2.

50. While the language of the Protocol does not include products *later* found to be detrimental to the ozone, the authors contend that this escape is possible. *Cf. id.* art. 4,

Additional provisions regarding the reporting of production and consumption data by parties to the Secretariat,<sup>51</sup> and research, development, public awareness, and exchange of information structure the Protocol's four step approach to CFC regulation.<sup>52</sup> Most notably, Article 9 prescribes international cooperation in promoting public awareness of the environmental effects of the emissions of controlled substances and other substances that deplete the ozone layer.<sup>53</sup> The remaining portions of the Protocol deal with administration of the agreement.<sup>54</sup> Finally, it should be observed that while the agreement contains an article titled "Non-compliance,"<sup>55</sup> this clause remains without substantive meaning. It provides only that "[t]he Parties at their first meeting, shall consider and approve procedures and institutional mechanisms for determining non-compliance with the provisions of this Protocol and for treatment of Parties found to be in non-compliance."<sup>56</sup> This article demonstrates the Protocol's lack of enforcement potential. Probably few parties will comply when faced with the loose terms of an agreement devoid of coercive capacity.

By enacting the Protocol, the international community took affirmative steps toward protecting the ozone. The Parties based this protection on regulation of the consumption, production and trade of chemicals known to decimate the ozone layer.

### III. ENFORCEMENT OF OZONE PROTECTION MEASURES

The quintessential question of all international agreements centers on enforcement. The Montreal Protocol, and more broadly, all international environmental agreements are no different. It is questionable whether the Protocol can be enforced in a world of sovereign states empowered and intent to act for their own welfare

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para. 3. According to this paragraph, parties which have not objected to the list of chemicals found to decimate the ozone layer shall ban, within one year, the import of the those products from any state not a party to the Protocol.

51. *Id.* art. 9.

52. *Id.* art. 9, para. 2. Article 9 states that parties shall cooperate, "consistent with their national laws, regulations and practices . . . in promoting, directly or through competent international bodies, research, development and exchange of information" relating to best technologies, alternative substances, products containing controlled substances, and products manufactured with them, and the costs and benefits of relevant control strategies. *Id.*

53. *Id.*

54. *See generally id.* arts. 11-20.

55. *Id.* art. 8.

56. *Id.*

rather than for the benefit of the international community. This discussion requires a brief analysis of the inherent interconnection between environment, economics, and politics. Further, it demands analysis of the Protocol within this framework.<sup>57</sup> The second part of this section suggests that the world community may eventually<sup>58</sup> more effectively enforce the Protocol and other environmental agreements by altering the approach to environmental protection from economic incentive to moral imperative. Commonly accepted notions regarding the origins and enforceability of laws generally, and evidence of a potential global change in attitude towards the environment form the foundation of this recommendation.

#### A. *Environmental Econo-Politics*

Earth is a finite globe. The constituents of any finite object are by definition finite as well. And so it is with the natural resources which comprise this planet: they have limits. Over the millennia, people pierced the delusion that Earth provides infinite resources free for exploitation by all.<sup>59</sup> Most people now realize that "Spaceship Earth"<sup>60</sup> cannot provide inexhaustible coffers of resources for human use.

Awareness that the environment provides limited resources causes groups to attribute value to these resources. The attribution

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57. Application of the principles of interconnection to the terms of the Protocol supports the conclusion that the economic and political consequences of CFC regulation may well allow some states to breach the agreement with relative impunity. The term "relative" is especially important to this portion of the argument. As will be argued later, econo-politics is about the allocation of scarce resources. While under the Protocol, a breaching state may suffer some economic consequences from the complying portion of the international community, the relative impunity of breach arises from the greater economic benefit to the country derived from breaching than the detriment suffered under international pressure.

58. "Eventuality" is another important limiting aspect of this thesis. The moralistic approach suggests not that objective Kantian moral imperatives will immediately strengthen the Protocol, but rather only describes a process through which greater international environmental protection may be gained by the necessarily slow alteration of attitudes towards our environment. See generally I. KANT, *ETHICAL PHILOSOPHY* (J. Ellington trans. 1983).

59. For example, 14th century London suffered such an extraordinary smog and soot problem that definite limits were set on the free exploitation of air. "Feelings ran so high on the subject . . . that a man was hanged for burning smoky coal." A. COTTRELL, *ENVIRONMENTAL ECONOMICS* 1 (1978).

60. "Spaceship Earth" is a popular extension of the Malthusian lifeboat dilemma, although environmental economist Kenneth Boulding is first credited with coining the term. Malthus argued that the world was incapable of sustaining an exponentially increasing population growth rate. To highlight the point, he analogized earth to a lifeboat capable of safely holding two passengers. Picking other victims of a maritime catastrophe from the water might well sink the boat and cause all to perish. Cf. L. CALDWELL, *supra* note 2, at 230.

of value summons the discipline of economics into the study of environmental problems. Economics is often defined as "the science which studies human behavior as a relationship between ends and scarce means which have alternative uses."<sup>61</sup> Thus, one may view economics as a social system for the distribution of resources to which different groups ascribe different values. The general question of how society allocates resources based on the value of each resource to a particular group is the juncture where economics joins the environmental and resource sciences.<sup>62</sup>

Similarly, politics, in common definitions<sup>63</sup> and used in ordinary language<sup>64</sup> inherently includes the question of allocating scarce resources. Statesmen constantly face the dilemma of efficiently and justly apportioning insufficient resources in a world of rising demands.<sup>65</sup> In the political context, however, the question is considered in terms of public administration rather than private value. In other words, allocation depends not upon who values the resource more, but upon which use of the resource most advantageously benefits the community.<sup>66</sup> Nevertheless, stable and effective public administration always accounts for private value in the

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61. L. ROBBINS, *THE NATURE AND SIGNIFICANCE OF ECONOMIC SCIENCE* (1932), cited in A. COTTRELL, *supra* note 59, at 1.

62. A. COTTRELL, *supra* note 59, at 3; T. TIETENBERG, *ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 17-19* (1984) (explaining that economic analyses can describe the human relationship to the environment, considered an asset to which we ascribe value).

63. For example, Webster defines politics as "the total complex of relations between people in society." WEBSTER'S NEW COLLEGIATE DICTIONARY 890 (5th ed. 1977). Similarly, Black defines politics as "the science of government; the art or practice of administering public affairs." BLACK'S LAW DICTIONARY 1043 (5th ed. 1979).

64. Developments in the philosophy of language indicate that terms derive meaning from the context of their use in ordinary language rather than from some fixed definition. See generally L. WITTGENSTEIN, *THE BLUE AND BROWN BOOKS* (2d ed. 1960); L. WITTGENSTEIN, *PHILOSOPHICAL INVESTIGATIONS* (3d ed. 1968); S. KRIPKE, *WITTGENSTEIN ON RULES AND PRIVATE LANGUAGE* (1982). To this end, in the context of ordinary language, the term politics includes the notion of endowing some with the power to decide how taxes (a resource) are spent, who receives government assistance for food, shelter, and clothing, and generally, how to divide among the public the benefits acquired by the entire society.

65. H. SPROUT, *THE CONTEXT OF ENVIRONMENTAL POLITICS* 135 (1978).

66. As a simple example, the political allocation of clean water depends not so much upon who values the water more, but upon which use of the water most efficiently benefits the community. Thus, if X offers \$1 per gallon for fresh water, and Y offers \$2 per gallon, an economic allocation dictates that Y receive the water. A political allocation, however considers the purpose for the water purchase. Hence, if Y plans to use the water to wash his car, while X plans to irrigate crops used to feed the community, a political allocation may dictate that X receive the water, though he pays less for it. See T. TIETENBERG, *supra* note 62, at 178 (graphically describing the gap between private and social optima in recycling of paper).

endeavor to most efficiently allocate insufficient resources.<sup>67</sup> Therefore, politics includes the concept of economics (especially distributive economics), and both politics and economics are inextricably related to the resources available in our environment.<sup>68</sup>

The Protocol will impact the econo-politics of the parties. One need look no further than the wording of the agreement itself to understand that the drafters of the Protocol intended to attack the problem of CFC regulation from an economic perspective. The preamble to the agreement, for example, specifically recalled Article XIV of the Vienna Convention for Protection of the Ozone Layer which laid the framework for the Protocol.<sup>69</sup> That article called upon all states and regional economic integration organizations to control their emissions of CFCs by any means at their disposal, including regulation of production and consumption.<sup>70</sup> One provision of the Protocol attempts to enact the goal of regulation through economic control by requiring reductions in production and consumption, though providing exceptions for domestic needs and industrial rationalization.<sup>71</sup> Another portion of the Protocol aims at economic regulation through control of trade in CFCs with non-parties.<sup>72</sup> And most significantly, the drafters of the Protocol recognized the disparate impact that regulation of CFC industries would impart on developing countries. The parties sought to minimize the inequity of this economic disparity by entitling less developed countries to delayed compliance, transfers of technology from developed countries, and economic incentives from developed countries for use of new technologies.<sup>73</sup>

Regional economic integration organizations, production, consumption, domestic needs, industrial rationalization, trade, economic disparity, and economic incentives are concepts which play

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67. Governments which fail to consider private value are unstable because their insensitivity to the values of constituents leads to change of regime either through political process or revolution.

68. One commentator notes that environmental politics evokes questions regarding "who gets what, who pays, and who will suffer in consequence." In the quagmire of multiple competing claims for insufficient resources "we see a prime example of the interrelatedness that is an invariable element of the context of environmental politics." H. SPROUT, *supra* note 65, at 154.

69. Vienna Convention, *supra* note 36, art. 15; Montreal Protocol, *supra* note 65, preamble.

70. *Id.*

71. *Id.* art. 2, paras. 1-4.

72. *Id.* art. 4.

73. *Id.*

a large role in the economic process. For example, production is an important function in the determination of the price (value) of goods on the market.<sup>74</sup> Consumption plays a similar role in determining value.<sup>75</sup> Since economic theory analyzes the allocation of scarce resources according to value, and production and consumption impact the determination of value, CFC regulation must affect the economies of the parties to the agreement. Indeed, because ozone depletion is linked to CFC emissions, "the problem involves economic and not just environmental concerns."<sup>76</sup>

### 1. Economic Consequences of CFC Regulation

The Protocol will likely have three major economic consequences. First, as regulation of CFCs under the Protocol requires reduced production and consumption of the chemicals, the CFC industries will no longer need to employ a sizeable work force. Therefore, regulation under the Protocol will exacerbate unemployment. This interpretation of the effects of the CFC regulation was favored by such developed countries as Great Britain and France. Prior to satellite confirmation of the alarming rate of ozone deterioration, these countries ardently opposed any CFC regulation for fear of increasing ever-rising levels of unemployment.<sup>77</sup> The problem of job loss as connected to CFC regulation has a corollary effect upon less developed countries where industry serves as a means of creating jobs, income, and financial stability. Regulation will at least partially prevent many less developed countries from starting or continuing their industrialization process, and

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74. The quantity of goods produced is one variable considered in determining the price of a good. Assuming that demand for good X remains constant, the point where supply intersects demand represents the value of X. As supply increases, price decreases, and as supply decreases, price increases. This simplified explanation is a concept commonly referred to as the law of supply and demand. A. COTTRELL, *supra* note 59, at 3-5.

75. Consumption serves to represent demand in the market just as production represents supply.

76. See *Confronting the Threat*, *supra* note 8, at 453.

77. Unemployment levels in France steadily increased from 5.2% in 1978 to 10.6% in 1987. The United Kingdom suffers similar difficulties, enduring unemployment increases from 5.7% in 1978 to 11.9% in 1986. INT'L LABOR OFFICE, YEARBOOK OF LABOUR STATISTICS 635, 639 (1988). Both countries also avoided regulation for fear of compromising their trade position in the international marketplace. Comment, *supra* note 7, at 455. Others, however, disagree that regulation will necessarily cause the loss of jobs. They argue that regulation will spur new research and development efforts to discover alternative substances. Once found, these new substances will be used in the same manner and require more personnel for their manufacture. Under this view, regulation will actually create jobs for the scientists needed to complete the research and development.

thus, effectively deprive them of future jobs.<sup>78</sup>

Second, the price of CFC-produced goods will increase. According to the laws of supply and demand, as regulation on production curbs the amount of CFC goods available in a market with fixed or increasing demand for CFCs, the price increases as a reflection of the extra value people attach to scarce products.<sup>79</sup> Some might argue that increasing price hinges upon the assumption of constant demand and that terms of the agreement take both supply and demand into account by regulating production and consumption in tandem. Thus, as production decreases, and consumption decreases, both the supply and demand for CFCs will change simultaneously, causing price to remain constant. Nevertheless, fixed demand for CFCs for the immediately foreseeable future is a safe assumption in view of the fact that no alternative substances for CFCs exist. While there is no guarantee that demand for CFC products will remain fixed or increase indefinitely, the nonexistence of suitable chemical equivalents strengthens the argument that demand will at least remain constant in the foreseeable future.<sup>80</sup> Even if industry succeeds in discovering CFC substitutes, the goods produced with these replacements will initially bear a high cost. Industries now dependent on CFCs for production of goods must pay for the transition from CFC based production to the alternative methods. Of course, this cost of transition from one mode of production to another ultimately impacts the consumer, who will pay a higher price for the good in the market.<sup>81</sup>

The extraterritorial effects of CFC consumption further hamper enforcement of the Protocol. In economic-political terms, the seemingly free gifts of nature, like air, water, and ozone, have qual-

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78. Former Indian Prime Minister Indira Gandhi appropriately expressed this corollary concern when she stated, "Rich countries may look upon industrialization as the cause of environment destruction, but to us it is one of the primary means of improving the environment of living. . . . How can we speak to those who live in villages and in slums about keeping oceans, rivers, and air clean when their own lives are contaminated at the source?" Struthers, *The United Nations Environment Programme After a Decade: The Nairobi Session of a Special Character*, 12 DEN. J. INT'L L. & POL'Y 269, 281 (1983), as quoted in *A 200-Point Ecology Plan Gains at U.N. Conference*, N.Y. Times, June 15, 1972, at A12, col. 3.

79. See *supra* notes 66, 67.

80. See *supra* notes 24-27 and accompanying text. The assumption that demand will remain fixed is supported by the fact that even if the United States is capable of limiting demand, other countries with expanding industry and wealth have increasing demand for CFC-dependant products. For example, the Peoples' Republic of China has expressed concern over CFC regulation because current demand for refrigeration in that rapidly developing country requires the expansion of its CFC industry. See *Nightline*, *supra* note 35.

81. Comment, *supra* note 7, at 454.



ity (*i.e.*, the air is "clean," the water is "pure," the ozone is "sufficient"). The quality of the resource gives the resource value. In other words, pure water is worth more than contaminated water, clean air is worth more than dirty air, and sufficient ozone is worth more than insufficient ozone. The consumption of environmental quality is called pollution. Pollution is objectionable because it involves the inefficient use of a resource to which we attach value.<sup>82</sup> In economic-political terms then, ozone is a scarce resource, and CFC production constitutes pollution in that it destroys a valuable resource.

In a world community where environmental quality is a scarce resource but erroneously treated as free by one nation, the costs of pollution are not borne by those responsible for it. Therefore, the third economic consequence of the Protocol is that countries which breach the agreement will not bear the true cost of the devastation caused by CFC production. Rather, that portion of the population which inhabits the contaminated environment ultimately bears the cost of CFC pollution, while the offending countries continue to seek optimum economic activity based upon their inevitably smaller private costs.<sup>83</sup>

The international "free rider" problem is not easily dismissed in a world of sovereign states. State sovereignty, a basic tenet of international law, prevents an international body from forcibly compelling a nation to comply with agreements.<sup>84</sup> The very notion of sovereignty ensures that each nation will act in its own best interest, even when such action constitutes a breach of a prior agreement.<sup>85</sup> Thus, in the pragmatist's discourse, all action by states

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82. A. COTTRELL, *supra* note 59, at 39.

83. *Id.* at 44. See also Smith, *The United Nations and the Environment: Sometimes a Great Notion?*, 19 TEX. INT'L L. J. 335, 337 (1984) (arguing that many member states of the U.N. Environment Programme refuse to take responsibility for their environmental errors, and instead seek compensation from other states for their errors); cf. Comment, *Deforestation in Brazil: Domestic Political Imperative—Global Disaster*, 18 ENV'T L. REP. 536, 570 (1988) (concluding that the vast extraterritorial benefits derived from the Amazon rain forests by the international community warrants the international community paying for their preservation) [hereinafter *Deforestation in Brazil*].

84. See W. GORMLEY, *HUMAN RIGHTS AND ENVIRONMENT: THE NEED FOR INTERNATIONAL COOPERATION* 58 (1976). Some commentators contend that sovereignty poses an almost insurmountable hurdle to international cooperation, allowing states to act within their jurisdiction in a manner which affects adversely areas beyond their borders "subject only to fragmented and primitive values of international responsibility." A. SPRINGER, *THE INTERNATIONAL LAW OF POLLUTION: PROTECTING THE GLOBAL ENVIRONMENT IN A WORLD OF SOVEREIGN STATES* 31 (1983).

85. Here, "best interest" includes a balancing of the costs and benefits of breaching the

may be reduced to what each country perceives as its most beneficial course of conduct.<sup>86</sup>

By attempting to regulate globally CFCs through economic means, the international community apparently demands that less developed countries forego their own best interest in favor of larger societal interests by limiting the standard of living increases associated with industrialization.<sup>87</sup> The already difficult problem of enforcement in this context expands geometrically when accounting for conflicting definitions of "need"<sup>88</sup> in a world of sovereign states. International enforcement of a Protocol with massive economic consequences, especially for less developed countries, is therefore unlikely.

## 2. Political Consequences of CFC Regulation

These three major economic effects for parties to the Protocol will cause national and international political repercussions because CFC industries have a vested interest in keeping their unregulated products on the market.<sup>89</sup> For example, one political conse-

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agreement. For less developed countries, the cost is bound to be lower than the benefit of continuing to support CFC industries. The weapons which the international community might employ to enforce the Protocol on breaching countries are economic pressure and diplomatic negotiations. Yet in the delicate world of international agreements, the contemplated methods of enforcement are purposely weakly crafted in order to persuade the most countries possible to join the agreement. See *supra* note 47 and accompanying text. International law is not coercive like law in the domestic context. Rather than wielding force, international law is more a means of predicting reactions and positioning of alliances. See A. Swan & J. Murphy, *The Regulation of International Business and Economic Relations* 119, 128, 148 (1988 ed.) (unpublished manuscript).

86. The Melian Debate, recorded by Thucydides in 416 B.C. provides a classic example of "interest politics." In the great wars between Athens and Sparta in 431-404 B.C., Melos, a small neutral island, became the object of Athenian imperialism. Athenian generals offered the Melian people their lives in return for their enslavement. The Melians, however, countered that the virtues of a free life dictated that if pressed, they must fight a losing war against the Athenians. In the course of the ensuing dialogue, the Athenians argued that "into the question of human affairs the question of justice only enters where there is equal power to enforce it, and that the powerful grasp what they can, and the weak grant what they must." THUCYDIDES, *The Peloponnesian Wars*, in *THE GREEK HISTORIAN: THE COMPLETE & UNABRIDGED HISTORICAL WORKS OF THUCYDIDES* (B. Jowett trans. 1942); see also M. SMALL & J. SINGER, *INTERNATIONAL WAR* 128 (1985).

87. E. DALE, JR., *THE ECONOMICS OF POLLUTION, THE POLITICS OF NEGLECT* 224 (1971). The aforementioned statement of former Indian Prime Minister Indira Ghandi (*supra* note 78) buttresses the view that domestic imperatives will likely outweigh any economic sanctions the international community impose against violating countries. See generally *Deforestation in Brazil*, *supra* note 83 (arguing that domestic necessities require Brazil to plunder the Amazon for its economic value at the cost of global environmental security).

88. See *supra* note 45 and accompanying text.

89. Comment, *supra* note 7, at 454.

quence of the regulations which impinge upon this vested interest in the United States was the formation of the Alliance for a Responsible CFC Policy in 1980. This well-funded and highly organized group lobbied United States Congressmen in an effort to persuade them that the connection between CFCs and ozone deterioration was too tenuous to justify regulation of the billion dollar CFC industry.<sup>90</sup> Similarly, the abstention from agreement by the Soviet Union at the London Conference on Ozone Protection is a recent international political consequence of CFC regulation. Many cite the inclusion of a major CFC production facility in its five-year plan as the chief explanation for Moscow's hesitation to join the agreement.<sup>91</sup>

In third world countries, the political consequences of regulation are likely to be more severe. In countries struggling to extricate their people from the squalor of peasant life, present tangible problems take precedence over future intangible dilemmas.<sup>92</sup> Third world leaders understandably contend that wealthy nations like the United States can easily afford to look beyond their immediate necessities to the problems of tomorrow. Poorer countries, however, bear the burden of more pressing imperatives.<sup>93</sup>

Developing nations face the predicament of attempting to balance local political needs with disastrous global environmental consequences. Brazil's destruction of the Amazon rain forest poignantly illustrates this conflict between domestic political necessity and global environmental imperative. The Amazon, a large, unsettled portion of Brazil extremely rich in resources, has long been

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90. Hoppe, *supra* note 17, at 113; see also *supra* note 17 and accompanying text (describing the industry position on regulation of CFCs).

91. *Nightline*, *supra* note 35.

92. Comment, *supra* note 7, at 454.

93. The Bangladeshi Representative attending the 1977 meeting of the United Nations Environment Programmes Governing Counsel explained, "To us the controversy over harm caused to the ozone layer . . . is simply not relevant. Increasing soil productivity, coping with natural disasters, and meeting basic human shelter needs are the areas in which the country should concentrate." See A. SPRINGER, *supra* note 84, at 23.

Vermont Governor Madeline Kunin, Chairperson of the National Governor's Association Committee on Energy and Environment, expressed similar political concerns in a different context. While Vermont remains a paragon of environmental activism (for example, by introduction of the Third Century Trust, which includes legislation prohibiting the installment of air-conditioners in cars sold in Vermont), Governor Kunin explained: "It's a lot easier to talk about this globally than to act locally. People say all the right things, but when it comes to their own back yards, it's very tough." Kurtz, *Environmentalist Governor Battles Her Natural Allies*, Miami Herald, Dec. 31, 1989, at A23.

the target of grand development schemes<sup>94</sup> to benefit a perpetually struggling domestic economy, alleviate a crushing foreign debt problem, and ameliorate the seething social and political pressures of the landless poor.<sup>95</sup>

With the realization that rapid exploitation of resources fosters immediate economic development, recent Brazilian governments facilitated deforestation, road building, land settlement, and timber harvesting programs.<sup>96</sup> The resulting devastation<sup>97</sup> has vast extra-territorial environmental effects.<sup>98</sup> Yet, the long-term international effects of "pillaging the forest environment mean little to masses of people facing starvation, or to governments faced with staggering foreign debt, great income disparities among their people, and an intense desire to modernize."<sup>99</sup> Rather, the seething econo-political pressures within Brazil force policy-makers to view deforestation and its consequences as "progress."

Less developed countries faced with industrial opportunity through CFC production confront the same dilemma. In the hard currency of interest politics, immediate tangible domestic needs in-

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94. These development schemes generally sought a rapid development of Brazilian hinterlands, with rapid settlement and exploitation of western territories. See H. RODRIGUEZ, *THE BRAZILIANS: THEIR CHARACTER AND ASPIRATIONS* 79-80 (1967). These plans called for the construction of the 5000 kilometer TransAmazon Highway. As part of the construction plan, the Brazilian Government set aside 100 kilometers on either side of the highway for farming and large scale logging and cattle operations. *Deforestation in Brazil*, *supra* note 83, at 542. Further, to stimulate public and private sector investment in development of the Amazon, the Brazilian Government enacted Operations Amazonia and Polamazonia, which encouraged development through large land concessions coordinated with construction of Amazonian infrastructure. *Id.* at 541-43.

95. *Deforestation in Brazil*, *supra* note 83, at 538.

96. *Id.* at 570. As one Brazilian Congressman declared, "The green area of the Amazon should be totally devastated . . . because the forest represents the paralyzation of the country's development." *Id.* at 537.

97. The amount of deforestation is greatly disputed. Some naturalists estimate that only a 1.2% reduction in forest size took place in 1980. White, *Nature's Dwindling Treasures*, NAT'L GEOGRAPHIC, Jan. 1983, at 2, 33. Estimates are imprecise but range as high as a 25% reduction in forest size which occurred as early as 1978. D. MAHAR, *FRONTIER DEVELOPMENT POLICY IN BRAZIL: A STUDY OF AMAZONIA* 126 (1979). Notwithstanding the dispute over the degree of devastation, observers generally agree that the rate of deforestation is increasing. See Grainger, *The State of the World's Tropical Rain Forests*, 10 *ECOLOGIST* 6, 47 (1980).

98. For example, the rain forest produces two-thirds of the world's fresh water. Total destruction of the forest will result in a global draught. Further, the forest acts as a climatological moderator. Destruction of the forest will affect adversely global weather patterns. Finally, countless species of animal and plant thrive only in the Amazon. Destruction of the rain forest will lead directly to their extinction. *Deforestation in Brazil*, *supra* note 83, at 537.

99. *Id.* at 569.

evitably outweigh future intangible international consequences. With regulation of CFCs, "the political choice of strategy is affected by considerations of national economic advantage and disadvantage."<sup>100</sup> While countries may agree upon elimination of non-essential uses of CFCs, the precise definition of the term "non-essential"<sup>101</sup> points up the Protocol's enforceability problems. Indeed, in the Third World, CFC production may well prove essential to political stability or economic growth.

### *B. A Moralistic Approach to Regulating CFCs*

Contrary to the Protocol, numerous international agreements are enforceable currently based on moral concerns despite the impediment of sovereignty.<sup>102</sup> For example, as a reaction to its vast experience with wars, and fearing that "what we conveniently call inhumanity is simply humanity under pressure,"<sup>103</sup> the international community slowly forged an area of international criminal law specifically aimed at wartime activities. Notably, the practices of the Nazis attempt during World War II to eliminate entire groups of people raised questions of whether such destruction constituted crimes against humanity.<sup>104</sup> In the aftermath of the Holocaust, the United Nations General Assembly unanimously adopted Resolution 96 (I),<sup>105</sup> condemning genocide as a crime under international law. Passage of Resolution 96 (I) eventually led to the drafting and passage of the Convention on the Prevention and Punishment of the Crime of Genocide.<sup>106</sup> The Convention defined

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100. Johnston, *supra* note 7, at 264. See *supra* notes 93 & 94 and accompanying text.

101. An analogous undefined term from the Protocol itself is "domestic needs." See *supra* note 44.

102. See generally J. BARROS, *THE INTERNATIONAL LAW OF POLLUTION* 379 (1974). Note that these agreements deal with subjects ranging from forbidden types of weaponry to the protection of certain species of animals. Cf. *The Hague Regulations Respecting the Laws and Customs of War on Land*, Oct. 18, 1907, 36 Stat. 2277, T.S. 539, 1 Bevans 631; *Treaty for the Conservation of Antarctic Seals*, June 1, 1972, 29 U.S.T. 441, T.I.A.S. 8826.

103. M. WALZER, *JUST AND UNJUST WARS* 4 (1977). International criminal law on wartime behavior provides a salient example of moral regulation in spite of sovereignty for two reasons. First, wartime is when states act in their most sovereign capacity. Second, international agreements regarding wartime behavior demonstrate the power of moral regulation because wars often evince people's most immoral behavior. If the global community can enforce moral agreements upon states during wartime, then certainly, that same community may enforce international laws regarding less morally problematic topics like environmental protection.

104. G. VON GLAHN, *LAW AMONG NATIONS* 303 (5th ed. 1986).

105. This resolution was adopted December 11, 1946.

106. G.A. Res. 260, U.N. Doc. A/810 (1948), reprinted in 45 AM. J. INT'L L. 7-10

genocide as any act committed with intent to destroy a national, ethnic, racial, or religious group.<sup>107</sup> Article V of the Convention provides for enforcement of the criminal laws of the international community against offending parties.<sup>108</sup> Further, Article VI specifically states that persons charged with the crime of genocide are to be tried by a competent tribunal of the state in which the act was committed or by such international penal tribunal as may have jurisdiction.<sup>109</sup>

Why were the countries that signed the Convention willing to yield some of their sovereignty in favor of an international criminal law? Isolating the distinctive feature of the Convention which makes it enforceable and applying that feature to international environmental law may lead to greater enforceability of the Montreal Protocol.

Enforceable international agreements which criminalize certain acts possess one common element—they rely upon moral rather than economic considerations. As a result, the international consensus against genocide facilitated both its criminalization and the enforceability of the Genocide Convention. In fact, the permanent and pervasive element of all criminal law is its moral grounding.<sup>110</sup> According to the late sociologist Emile Durkheim, “crime

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(1951)(doc. supp.).

107. *Id.* art. II.

108. *Id.* art. V.

109. *Id.* art. VI; G. VON GLAHN, *supra* note 104, at 304. Other war crimes include using poisoned weapons, firing on undefended localities, firing on a flag of truce, poisoning streams and wells, killing military personnel who have surrendered, killing or attacking harmless civilians, attacking hospitals, torture, and inhuman treatment of prisoners. *Id.* at 774-75.

110. E. DURKHEIM, *THE DIVISION OF LABOR IN SOCIETY* 71 (1933). By morality, I mean not that which is moral or right in the objective sense, but that which seems right to the members of a society. Various definitions of morality in different contexts exist. Nevertheless, in the realm of law, at least one commentator follows Durkheim and suggests the possibility of interpreting moral to mean the general consensual morality of a particular community. Welch, *The State as Purveyor of Morality*, 56 *GEO. WASH. L. REV.* 540, 545 (1988). As demonstrated by the extraterritorial effects of environmental problems (*see supra* note 23 and accompanying text), all sovereign states are considered members of the same global community. Most principles of international law have their roots in this type of morality. For example, the *Corfu Channel* case, (U.K. v. Alb.), 1949 *I.C.J.* 4, 34, established the international legal principle that countries ought not act within their own jurisdictions in a manner which effects other sovereign nations adversely. This internationally recognized “moral” rule already serves as the guiding principle for much international environmental law. Comment, *supra* note 7, at 440.

Other principles regarding the preservation of environment for the enjoyment of future generations may one day serve as the moral basis for the criminalization of environmental abuse. See T. O’Riordan, *Advocating the Rights and Interests of Future Generations*, in

shocks sentiments which for a given social system are found in all healthy consciences."<sup>111</sup> Though we remain incapable of drawing a complete list of the sentiments which individuals of a society share, the most deeply ingrained sentiments are known and shared by all.<sup>112</sup> Crime is an affront to the totality of beliefs common to average citizens of the same society.<sup>113</sup> Therefore, because laws result from choices about values a community chooses to espouse and goals it deems important to pursue, morality serves as a source of law.<sup>114</sup> Extending the above principles to an environmental context, it appears that the key to enforcing international environmental agreements is criminalizing specific environmental abuses. Such a move, however, depends upon enormous change in world consciousness. Nevertheless, such a change in world perception may be evolving. For example, statistical evidence supports this trend. Data collected between 1978 and 1984 indicates that Americans had strong views on environmental issues, even when required to choose between clear environment and economic trade-offs.<sup>115</sup> Other polls indicate that "public support for environmental protection remains high and has not declined" in spite of recent deteriorating economic conditions.<sup>116</sup>

The Montreal Protocol itself is another example of this moral change. Regardless of the economic means chosen to regulate and alleviate the problem of ozone depletion, the fact that the Protocol attempts to address the problem at all demonstrates that continued decimation of the ozone is a problem which the international community is morally bound to rectify. The Protocol, though acting in economic terms, reflects the greater moral value which the global community places on environmental quality, and ultimately, on self-preservation.

The disagreement over the means to protect the environment, rather than the demonstration of the absence of moral agreement,

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DISTRIBUTIONAL CONFLICTS IN ENVIRONMENTAL RESOURCE POLICY 419 (Schnaiberg, Watts & Zimmerman eds. 1986).

111. E. DURKHEIM, *supra* note 110, at 73.

112. *Id.* at 74.

113. *Id.* at 79. "An act is criminal when it offends strong and defined states of the collective conscience." *Id.* at 81.

114. Welch, *supra* note 110, at 545.

115. D. Morrison, *How and Why Environmental Consciousness Has Trickled Down*, in DISTRIBUTIONAL CONFLICTS IN ENVIRONMENTAL RESOURCE POLICY (Schnaiberg, Watts & Zimmerman eds. 1986).

116. *Id.* at 197. The study reaching this conclusion was conducted by Lowe, Pinhey, and Grimes in 1980 utilizing national longitudinal data (1973-78).

underlines the moral common ground shared by those engaged in the debate. Few people disagree on the morality of protecting the environment.<sup>117</sup> People argue about *how* to save the environment, or *how* to prevent ozone depletion, but not about whether they *ought* to protect the environment. The dialogue concerning the method of protection employed lies moot absent the prior moral agreement that environmental protection is necessary.

Post materialist politics in the United States and Western Europe also indicate change in world perception concerning the environment. This "new politics" presents an ideological counterthrust to the values of industrial society. It questions the belief inherent in industrial society that economic growth is the best means to secure social progress.<sup>118</sup> Post materialism posits the impossibility of maintaining economic growth without ultimately and irreversibly damaging the environment, thus leading to a decline in the quality of life. Rather than contesting the benefits of economic growth, post materialism recognizes that growth causes deleterious side effects in environmental quality which outweigh those benefits.<sup>119</sup> Thus, it is no accident that ecologists spearhead the post material political movement.<sup>120</sup>

The media, another indicator of public concerns, is replete with other less esoteric examples of the greater moral value now

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117. In response to environmental dilemmas, many 20th Century environmentalists attempted to formulate a philosophy articulating a defense of the environment. These philosophies included the notion that humanity's "best interest" (i.e., survival or quality of life) lies in preservation. For example, Burton MacKaye argued that the humans exhibit bi-polar gregariousness and solitary characters which are best satiated through access to wilderness. B. MACKAYE, *LIVING WILDERNESS* 4 (1939). See also H.D. THOREAU, *WALDEN* (1961) (on the human need to blend civilization and wilderness). Others argued for preservation of the environment for future generations. See T. O'Riordan, *supra* note 110; J. Feinberg, *The Rights of Animals and Unborn Generations*, in *PHILOSOPHY AND ENVIRONMENTAL CRISIS* 43 (1974). Still others argue that wilderness, and the environment by extension, has a right to exist for its own sake, regardless of whether humanity values it. See A. WHITEHEAD, *THE CONCEPT OF NATURE* (1920); K. Simonsen, *The Value of Wilderness*, 3 *ENVIRONMENTAL ETHICS* 259 (1981).

118. See G. SMITH, *POLITICS IN WESTERN EUROPE* 36 (4th ed. 1984). In the United States, post materialism and cries for economic reform became popular near the end of the 1960s. However, amid rising standards of living and population growth which contributed to the pollution problem, reform became a lost cause. See W. O'NEILL, *COMING APART: AN INFORMAL HISTORY OF AMERICA IN THE 1960s* 422 (1971). Thus, it remained exceedingly difficult politically to enact environmental legislation because it would ultimately diminish personal income. After all, the high costs of pollution abatement would be paid for, if at all, through increased prices and taxes. *Id.*

119. See W. CHAFE & H. STIKOFF, *A HISTORY OF OUR TIME* 367 (1983).

120. See G. SMITH, *supra* note 118, at 36.



placed on the environment. Advertisements,<sup>121</sup> political campaigns,<sup>122</sup> and various current events documented by the media<sup>123</sup> all demonstrate the popularity of the idea of environmental protection. Ecologically and environmentally oriented business ventures offer final evidence of a massive change in attitude towards the environment. Popular environmental concerns led entrepreneurs to invest in "clean up" organizations for solid waste and hazardous waste treatment, analytical, consulting, and engineering firms, equipment suppliers, and recyclers to name a few.<sup>124</sup> Indeed, the environment has become the "people's cause."<sup>125</sup>

Awareness of the value of environmental quality is not a change in perception which will occur in short course. Nevertheless, current attitudes towards the environment are significantly different from those common during the time of Lewis Cass and George Gilmer.<sup>126</sup> This growing international consensus, like the international outrage toward the act of genocide, may ultimately serve as the moral basis for criminal rather than economic sanctions for environmental abuse.

Therefore, a moralistic approach to enforcement of environmental agreements envisions an international community which avoids the problems associated with attempts at environmental protection through economic regulation. Instead, enforcement of

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121. For example, Time Magazine recently published a 12-page special advertisement from Volvo extolling the ecologic virtues of its automobiles and its corporate commitment to a "green future." TIME, Nov. 27, 1989, Special Advertising Section.

122. During his campaign for the Presidency, George Bush garnered much public support by declaring himself the "environment President." Krog, *Bush v. Dukakis v. Environment*, Miami Herald, Sept. 5, 1988, at 21A.

123. For example, medical waste washing ashore on the United States East Coast forged a "marked shift in public attitudes about environmental crimes," causing prosecutors to crackdown on corporate polluters. Marcotte, *Crackdown on Polluters*, ABA J., May 1989, at 36. The *Exxon Valdez* disaster, where an Exxon oil tanker spilled 11 million gallons of oil into Alaska's ecologically vulnerable Prince William Sound, rallied yet another shift in public perception. According to one article, many Alaskans inherently suspect the oil industry, and enforce previously ignored laws requiring tankers to file emergency spill clean up plans before entering Alaskan ports. N.Y. Times Service, *Alaskans Shift Gears About Oil*, Miami Herald, June 3, 1989, at 6A. See also Beck & Hager, *Buried Alive—The Garbage Glut: An Environmental Crisis Reaches Our Doorstep*, NEWSWEEK, Nov. 27, 1989, at 66.

124. Ames, *Cleaning Up*, Miami Herald, Nov. 20, 1989, Bus. Monday, at 1. According to some experts, environmental services is a classic growth industry, with a 20% to 25% annual growth rate, reaching a volume of \$108 billion by 1992. *Id.* at 14.

125. See Cousteau, *At Last Environment Has Become the People's Cause*, Miami Herald, Nov. 27, 1989, at 15A. According to Cousteau, leaders who ignore the upswell in concern for the environment do so at their peril, for "environmentalism is becoming the domain of the many." *Id.*

126. See *supra* note 4 and accompanying text.

environmental treaties occurs through criminal sanctions imposed by member states which reflect moral outrage at environmental abuse. In order to facilitate the psychological change required for criminalization of environmental abuse, the international community must seek to develop a moral consensus through a public awareness campaign as contemplated by the Protocol.<sup>127</sup> For without the development of a collective consciousness which abhors environmental destruction, criminalization, and thus enforcement of environmental agreements, will be baseless.

#### IV. CONCLUSION

CFCs are rapidly depleting the stratospheric ozone layer, Earth's only protection from the deleterious effects of ultraviolet solar radiation. The international community reacted to the global threat of ozone deterioration by enacting the Montreal Protocol. The Protocol attempts to protect the ozone layer from CFCs by regulating their production, consumption, and trade. Enforcement of environmental agreements between sovereign states based upon economic regulation is difficult because of the inherent connection between environment, economics, and politics. Because for Third World countries the economic benefits attendant to CFC production outweigh the cost of the economic sanctions suffered under international pressure, many less developed countries with immediate domestic economic priorities which supersede the future intangible international environmental consequences of ozone deterioration may breach the agreement with relative impunity. Excision of the ozone crisis from the economic realm, and relocation of the dilemma within the parameters of moral discourse may provide one solution to the inexorable problem of enforcement. The world community may enforce future environmental agreements more effectively with criminal sanctions based upon the moral imperatives reflected in our ever-developing collective consciousness.

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127. International organizations are best positioned to further beneficially alter our environmental attitude. Recognizing the importance of public perception for effective enforcement of the agreement, the Protocol called for international cooperation in public education regarding the causes and effects of ozone deterioration. See *supra* note 52 and accompanying text.

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