

LESSONS FROM THE MONTREAL PROTOCOL: GUIDANCE
FOR THE NEXT INTERNATIONAL CLIMATE CHANGE
AGREEMENT

BY

BRYAN A. GREEN*

The Montreal Protocol for Substances that Deplete the Ozone Layer is one of the most successful international environmental agreements to date. With a continued spirit of cooperation, the parties to the treaty have consistently relied on important international environmental legal principles as the foundation for adopting effective steps to address stratospheric ozone depletion.

The lessons learned from the Montreal Protocol should be used as guidance to formulate a more effective and successful international response to climate change. The Kyoto Protocol to the United Nations Framework Convention on Climate Change, the international community's current approach, aimed to emulate the factors contributing to the success of that global response to ozone depletion. However, the Kyoto Protocol deviated from some of the interpretations of important environmental legal principles utilized and exhibited in the Montreal Protocol. As a result, the Kyoto Protocol failed to generate the same effectiveness and international spirit of cooperation which continue to symbolize the negotiations of the parties to the Montreal Protocol.

The climate change regime needs enhanced flexibility, incentives for industry involvement, and increased participation of developing nations. With the commitments of the Kyoto Protocol currently set to expire in 2012, the next international agreement addressing climate change must better incorporate the Montreal Protocol's success factors.

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* Bryan Green is a J.D. candidate at Texas Tech University School of Law and has a B.A. in International Studies from the University of Denver. He would like to extend a special thanks to Professor Gabriel Eckstein for all his guidance and assistance throughout the writing process.

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I. INTRODUCTION

Lessons from the Montreal Protocol on Substances that Deplete the Ozone Layer's (Montreal Protocol)¹ approach to ozone depletion and its incorporation and utilization of important international environmental law principles can serve as a model to alter and further develop the next international agreement to better and more effectively address climate change. The current global response, the Kyoto Protocol to the United Nations Framework Convention on Climate Change (Kyoto Protocol),² has woefully fallen short of the same success the Montreal Protocol enjoyed. Though the issues of climate change and ozone depletion have significant differences, they are intertwined both by similarities and overlapping interests directly affecting the efficiency of the other.³ Ozone depletion and climate change are important issues due to the nature of the threats each poses to the world and the vast array of possible consequences that could result from their effects. Both have generated controversy, both are environmental concerns, and both present threats and consequences of a global nature requiring global action in response.⁴

This Comment examines these two environmental challenges and the approaches taken by the international community—through the Montreal Protocol and the Kyoto Protocol—to confront them. The principles highlighted in this Comment are increasingly important as the issue of climate change itself continues to be at the forefront of public debate. The two protocols represent the principal global steps taken to address ozone depletion and climate change respectively.⁵ Thus, many of the successes of one can provide an effective parallel way to approach and improve the other. The Montreal Protocol met heralded success and

¹ Montreal Protocol on Substances that Deplete the Ozone Layer, Sept. 16, 1987, T.I.A.S. No. 11,097, 1522 U.N.T.S. 3 [hereinafter Montreal Protocol].

² Kyoto Protocol to the United Nations Framework Convention on Climate Change, Dec. 11, 1997, 37 I.L.M. 22, available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf> [hereinafter Kyoto Protocol].

³ Laura Thoms, *A Comparative Analysis of International Regimes on Ozone and Climate Change with Implications for Regime Design*, 41 COLUM. J. TRANSNAT'L L. 795, 798–99 (2003).

⁴ See Cass R. Sunstein, *Of Montreal and Kyoto: A Tale of Two Protocols*, 31 HARV. ENVTL. L. REV. 1, 2–3 (2007) (listing the similarities of ozone depletion and climate change).

⁵ See KAREN L. CLARK, WORLD WIDE FUND FOR NATURE INT'L, A MONTREAL PROTOCOL FOR POPS?: AN EVALUATIVE REVIEW OF THE SUITABILITY OF THE MONTREAL PROTOCOL AS A MODEL FOR INTERNATIONAL LEGALLY BINDING INSTRUMENTS REGARDING THE CONTROL AND PHASE-OUT OF PERSISTENT ORGANIC POLLUTANTS, at II.3 (1996), <http://www.chem.unep.ch/pops/indxhtml/manwg8.html> (last visited Jan. 25, 2009) (noting that the Montreal Protocol has surpassed the Vienna Convention for the Protection of the Ozone Layer as the most important treaty addressing ozone depletion, despite the Vienna Convention's importance in leading to the protocol); Cinnamon Carlarne, *Climate Change Policies an Ocean Apart: EU & US Climate Change Policies Compared*, 14 PENN ST. ENVTL. L. REV. 435, 437 (2006) (establishing that the Kyoto Protocol represents “the legal commitments of the international climate change regime”).

overcame all the odds, while the Kyoto Protocol has never overcome criticism and controversy.⁶ The Montreal Protocol succeeded and overcame obstacles where the Kyoto Protocol failed and the obstacles proved insurmountable.⁷ The protocols have had such different results for a variety of reasons. Factors ranging from magnitude of the potential threats to faulty interpretation of principles and precedents all contributed to the effectiveness of the strategic responses chosen by the international community.⁸ In order to improve the next generation of response regimes, these factors need to be understood.

Part II discusses ozone depletion while focusing on the development of both the realization and awareness of the problem as well as the solution. It explains the role environmental principles, such as the precautionary principle and the principle of common concern, played in the evolution of the world's response to ozone depletion.⁹ Finally, Part II also examines the Montreal Protocol for its strengths and successful mechanisms that could be applicable to climate change as well.

Part III examines the issue of climate change and the approach that the international community has taken to address it. It specifically points to the ways climate change and the Kyoto Protocol differ from ozone depletion and the Montreal Protocol. Last, an assessment and analysis of the Kyoto Protocol's disappointing efficacy sets the stage for Part IV which contains recommendations for improving the overall effectiveness of both treaties. Part IV provides an analysis of the key differences which are limiting the success of the international approach to climate change versus ozone depletion. It also includes recommendations for learning from the Montreal Protocol to improve the Kyoto Protocol's effectiveness, particularly focusing on the roles of state sovereignty and the principle of common

⁶ See, e.g., Thoms, *supra* note 3, at 802 (noting that the formation of the Montreal Protocol required overcoming a variety of obstacles before settling on the first agreed international regulations for ozone depletion); Sunstein, *supra* note 4, at 64 (concluding that the Montreal Protocol succeeded in its efforts to fight and reverse ozone depletion while the Kyoto Protocol "seems to have failed").

⁷ Thoms, *supra* note 3, at 801-02 (describing how at the beginning of the ozone negotiations in Montreal obstacles to agreement existed, such as resistance to regulations by the chlorofluorocarbon (CFC) industry, the small number of nations that had ratified the Vienna Convention, the lack of adequate alternatives to CFCs, and varying scientific uncertainty).

⁸ *Id.* at 798-99.

⁹ An emerging principle of international environmental law, the precautionary principle has varying definitions, but basically calls on states to take preventative measures to protect against environmental harm before the establishment of a scientifically certain causal link. O. Yoshida, *Soft Enforcement of Treaties: The Montreal Protocol's Noncompliance Procedure and the Functions of Internal International Institutions*, 10 COLO. J. INT'L ENVTL. L. & POL'Y 95, 121 (1999). Perhaps the most recognized definition comes from the United Nations Rio Declaration on Environment and Development which states the definition of the precautionary principle as: "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation." United Nations Conference on Env't and Dev., Rio de Janeiro, Braz., June 3-14, 1992, *Rio Declaration on Environment and Development*, princ. 15, U.N. Doc. A/CONF.151/5/Rev. 1 (Jun. 13, 1992) [hereinafter Rio Declaration]. The principle of common concern of mankind helps inspire collective action within the international community. It deems that "the international community has a legal interest under international law in the environment of the global commons, and that damage to the global commons is therefore an injurious act against the international community." Mark Allan Gary, *The International Crime of Ecocide*, 26 CAL. W. INT'L L.J. 215, 246 (1996). The principle of common concern of humankind demands that all states have the *erga omnes* responsibility to prevent damage to the global commons. *Id.*

but differentiated responsibilities. Part of improving the preservation of state sovereignty involves an examination of how properly linking the two protocols would strengthen the international community's approach to climate change. Due to the similarities and overlap between the issues of climate change and ozone depletion, potential for improvement on the Kyoto Protocol's mechanisms exists if proper cooperation with the Montreal Protocol is utilized. Such cooperation can begin with similar interpretation and applications of environmental principles. For example, much of the analysis of the principle of common but differentiated responsibilities focuses on the flawed interpretation of the principle by the Kyoto Protocol. In the end, this room for substantial improvement should drive the international community towards effective cooperation.

II. OZONE DEPLETION

A. Background

The Montreal Protocol is considered a landmark international environmental agreement for its relatively effective and successful approach to solving the problem of stratospheric ozone depletion.¹⁰ In fact, in 2003, then United Nations Secretary General Kofi Annan called it "perhaps the single most successful international agreement to date."¹¹ The issue of ozone depletion first was theorized and became a consideration in 1974 when two University of California, Irvine scientists, Mario Molina and F. Sherwood Rowland, expanded on the theory that chlorine in the stratosphere could initiate a chain reaction that would damage the ozone layer for an extended period of time.¹² They discovered that human-made chlorofluorocarbons (CFCs) and halons do not break down chemically in the lower atmosphere, but instead rise to the stratosphere.¹³ Molina and Rowland hypothesized that once in the upper atmosphere, the CFCs remain there for an extended period of time until they are eventually broken down by radiation from the sun. This process releases large quantities of chlorine atoms into the atmosphere, which depletes the stratospheric ozone layer.¹⁴ Critical to life, the ozone layer shields all living organisms from hazardous ultraviolet (UV) rays, "which damage cells and cause mutations, including skin cancer in humans."¹⁵

¹⁰ Elias Mossos, *The Montreal Protocol and the Difficulty with International Change*, 10 ALB. L. ENVTL. OUTLOOK J. 1, 2-4 (2005).

¹¹ United Nations Development Programme, 20 Years of the Montreal Protocol, <http://www.undp.org/chemicals/20yearsmontrealprotocol/> (last visited Jan. 25, 2009).

¹² See RICHARD ELLIOT BENEDICK, *THE IMPROBABLE MONTREAL PROTOCOL: SCIENCE, DIPLOMACY, AND DEFENDING THE OZONE LAYER 2* (2004), available at http://www.ametsoc.org/atmospolicy/documents/Benedickcasestudy_000.pdf (detailing the development and progression of various scientific theories regarding the effect of CFCs on the ozone layer for the American Meteorological Society's 2004 Policy Colloquium).

¹³ Mario J. Molina & F. S. Rowland, *Stratospheric Sink for Chlorofluoromethanes: Chlorine Atom-Catalysed Destruction of Ozone*, 249 NATURE 810, 810 (1974).

¹⁴ See BENEDICK, *supra* note 12, at 2 (referencing and summarizing the study report by Molina and Rowland).

¹⁵ Thoms, *supra* note 3, at 799.

Molina and Rowland's report sparked a new debate in the scientific community, because if their theory was correct, then the depletion of the ozone layer would expose the planet to dangerously enhanced levels of UV radiation.¹⁶ Such dangers implicated the emission of CFCs as a possibly significant health risk.¹⁷ Scientists warned the public about the many serious dangers of exposure to UV radiation, including: millions of future deaths from skin cancer, millions of cases of eye problems such as cataract and blindness, human immune system deficiencies, losses in food production and fisheries, damages to common materials such as plastic, and an increase in the greenhouse effect.¹⁸ Such serious warnings caught the attention of the general public, especially in the United States, and public awareness increased substantially due to the severe and unacceptable nature of the hazards. Ozone depletion became the first truly global environmental danger facing the world, and it proceeded to be "theorized, derided, [and] hotly debated."¹⁹

B. The Vienna Convention

In 1982, the United Nations Environment Program (UNEP) initiated intergovernmental negotiations for an international agreement to protect the ozone layer.²⁰ Ultimately the negotiations resulted in the Vienna Convention for the Protection of the Ozone Layer (Vienna Convention) three years later.²¹ This convention, signed by twenty states and the European Community in 1985, laid the legal framework for the international community to take steps to deal with the problem of ozone depletion.²² The argument for ozone protection marked the first

¹⁶ See BENEDICK, *supra* note 12, at 3 (discussing the aftermath in the world community to the shocking theory advanced by Rowland and Molina).

¹⁷ Sunstein, *supra* note 4, at 10.

¹⁸ BENEDICK, *supra* note 12, at 3; see also Daniel G. McCabe, Comment, *Resolving Conflicts Between Multilateral Environmental Agreements: The Case of the Montreal and Kyoto Protocols*, 18 FORDHAM ENVTL. L. REV. 433, 437 (2007) (citing ENVTL. INVESTIGATION AGENCY, TURNING UP THE HEAT: LINKAGES BETWEEN OZONE LAYER DEPLETION AND CLIMATE CHANGE: THE URGENT CASE OF HCFCs AND HFCs 2 (2006)); Lynn Anne Shapiro, Note, *The Need for International Agreements Concerning the Ozone Depleting Effects of Chemical Rocket Propulsion*, 4 S. CAL. INTERDISC. L.J. 739, 744 (1995); Jennifer S. Bales, *Transnational Responsibility and Recourse for Ozone Depletion*, 19 B.C. INT'L & COMP. L. REV. 259, 266–67 (1996); Sunstein, *supra* note 4, at 10. The "greenhouse effect" refers to the increase of trace or "greenhouse" gases in the atmosphere and the absorption and re-emission of heat radiation by these gases. See Lewis D. Solomon & Bradley S. Freedberg, *The Greenhouse Effect: A Legal and Policy Analysis*, 20 ENVTL. L. 83, 84 (1990). This process traps the heat inside the Earth's atmosphere, thereby acting like a greenhouse. *Id.*

¹⁹ RICHARD ELLIOT BENEDICK, WORLD SUMMIT FOR SUSTAINABLE DEVELOPMENT, ENVIRONMENTAL DECISION MAKING AND MULTILATERAL ENVIRONMENTAL AGREEMENTS 2 (2001) (discussing the roles ozone depletion and the world's response to it played in paving the way for other multilateral agreements to confront and resolve a vast array of other potentially harmful human-induced environmental concerns).

²⁰ See BENEDICK, *supra* note 12, at 6 (describing the driving forces, particularly Egyptian Executive Director of UNEP Mostafa Tolba, behind the decision of the international community to organize a formal response to ozone depletion despite the scientific uncertainty of the alleged cause-and-effect relationship).

²¹ Vienna Convention for the Protection of the Ozone Layer, Mar. 22, 1985, T.I.A.S. No. 11,097, 1513 U.N.T.S. 293 [hereinafter Vienna Convention].

²² *Id.* arts. 6–10 (outlining the duties and roles of the Conference of the Parties and the Secretariat and establishing the means to adopt and amend protocols and annexes); Thoms, *supra* note 3, at 800.

time the international community had taken formal steps to address an environmental threat before scientific certainty was established regarding the cause.²³ It was a major advance in the development of both the principle of common concern and the precautionary principle. Later, both of these principles would play a key role in the drafting of the Montreal Protocol.

While the parties acknowledged the potentially harmful impact on human health posed by ozone depletion, the Vienna Convention focused not on action, but on further research, collection, and exchange of scientific data.²⁴ It provided the framework for which future protocols would be negotiated and amended.²⁵ As a means to avoid disagreement amidst so much uncertainty, the Vienna Convention did not specify any substances estimated to be contributing to ozone depletion, and instead required party-states to “take appropriate measures” to protect against the “adverse effects resulting or *likely* to result” from damage to the ozone layer.²⁶ Thus began the powerful cooperative nature that was omnipresent throughout the ozone negotiation process and which became the backbone of the Montreal Protocol.

The Vienna Convention and attention to ozone depletion was strengthened later in 1985 when a new study by British scientists theorized that an ozone hole, a “portion of the stratosphere in which greatly diminished ozone levels were measured,” had developed over the Antarctic region.²⁷ While the evidence was not yet conclusive, the theory of a hole in the ozone layer further increased public awareness of the potential dangers of ozone depletion and heightened the world community’s overall sense of urgency.²⁸ This helped give the parties to the Vienna Convention renewed momentum when they met again in Montreal in 1987 to develop a protocol for reversing ozone depletion, as specified in the Vienna Convention.²⁹

C. The Montreal Protocol

While the issue of protecting against ozone depletion was legitimized by the Vienna Convention, its strength came from the subsequent Montreal Protocol, which consisted of a body of regulations whose purpose was to control, reduce, and eventually eliminate the production and use of the growing list of ozone

²³ See BENEDICK, *supra* note 12, at 6 (highlighting the significance of the international community’s decision to move forward with a global response to ozone depletion before science had confirmed the alleged harmful effects).

²⁴ Vienna Convention, *supra* note 21, arts. 3–4.

²⁵ *Id.* arts. 8–9.

²⁶ *Id.* art. 2, para. 1 (emphasis added); see also CLARK, *supra* note 5, at II.2 (discussing the conflicting positions regarding when the international community should actually take action to alleviate and reverse ozone depletion and the compromise that was reached that allowed the parties to move forward with the Vienna Convention).

²⁷ BENEDICK, *supra* note 12, at 8 (“[B]ased on balloon measurements of ozone . . . [i]t appeared that stratospheric ozone concentrations recorded during the Antarctic early spring . . . were about 40 percent lower than during the 1960s.”). This seasonal collapse of ozone concentration is considered the ozone hole. *Id.*

²⁸ See Peter M. Morrisette, *The Evolution of Policy Responses to Stratospheric Ozone Depletion*, 29 NAT. RESOURCES J. 793, 799, 814 (1989) (discussing the combination of factors that contributed to an increased public awareness of ozone depletion).

²⁹ Vienna Convention, *supra* note 21, art. 2, para. 2(c).

depleting substances (ODSs).³⁰ The agreement has been amended multiple times to better reflect the changing conditions and updated science regarding the problem.³¹ It is an incredibly flexible treaty that has successfully reduced global ozone-depleting chemical emissions by over ninety-five percent.³² UNEP's estimates anticipate the ozone layer should be back to its pre-1980 levels and condition by between 2050 and 2075.³³

Much of the success enjoyed by the Montreal Protocol can be attributed to the interpretations and approaches utilized by the parties towards fundamental international environmental law principles when they developed their solution strategy. The results likely would have been very different if the parties had employed different interpretations and use of those important principles. The Montreal Protocol utilized and provided a successful (and in some ways revolutionary) approach to the principle of common concern, the precautionary principle, state sovereignty, and the breakthrough principle of common but differentiated responsibilities.³⁴ Analysis of the Montreal Protocol shows that the common concern and precautionary principles played an important role in not just bringing the parties together and bringing ozone depletion to the forefront of international attention, but also in fostering a spirit of cooperation that has been an underlying force ever since. The cooperative nature generated by the common concern for the ozone layer and the selected precautionary approach greatly influenced the application of the principle of state sovereignty and the development of common but differentiated responsibilities. The interpretation and application of the latter two principles formed the backbone of the Montreal Protocol and its subsequent amendments.

As previously discussed, in the buildup to the negotiations in Montreal, there was a growing awareness and sense of urgency surrounding ozone depletion. The predicted consequences, though still only theories at the time, of extremely high rates of skin cancer deaths, eye problems, food production problems, etc., put the threat on a very perceptible and real level for people.³⁵ Even those skeptical of the

³⁰ See, e.g., McCabe, *supra* note 18, at 437–38 (noting that ODSs include such chemicals as CFCs, hydrochlorofluorocarbons (HCFCs), and methyl bromide, to name a few).

³¹ See CLARK, *supra* note 5, at II.3.

³² Sunstein, *supra* note 4, at 3–4.

³³ UNEP, KEY ACHIEVEMENTS OF THE MONTREAL PROTOCOL TO DATE (2007), available at http://ozone.unep.org/Publications/MP_Key_Achievements-E.pdf.

³⁴ See Armin Rosencranz, *The Origin and Emergence of International Norms*, 26 HASTINGS INT'L & COMP. L. REV. 309, 313–14 (2003) (explaining that the principle of state sovereignty in international environmental law means each nation has a recognized “sovereign right to exploit their own resources pursuant to their own environmental policies”). More broadly, the principle of state sovereignty provides for, *inter alia*, each nation’s political independence, territorial integrity, and freedom from outside intervention in its internal and external affairs. See Jianming Shen, *National Sovereignty and Human Rights in a Positive Law Context*, 26 BROOK. J. INT’L L. 417, 419–20 (2000) (explaining the role and meaning of the principle of state sovereignty in the international legal system). The idea behind the principle of “common but differentiated responsibilities” is that “some countries should contribute more than others to the provision of global public goods,” like the atmosphere. Christopher D. Stone, *Common but Differentiated Responsibilities in International Law*, 98 AM. J. INT’L L. 276, 283–84, 299 (2004) (discussing three common versions of the principle and the motivations and stances of the various actors on the global stage, as well as providing examples of the principle in action).

³⁵ See BENEDICK, *supra* note 12, at 3.

theories could understand the universal nature of the risk. Most people recognized that ozone depletion would affect everyone, and that unilateral action would be ineffective. Thus, ozone depletion emerged as a truly accepted common environmental concern.³⁶ Though the principle of common concern had yet to be explained and defined at the United Nations Conference on Environment and Development in Rio in 1992, the idea impacted the Montreal Protocol's drafting and greatly aided its success.³⁷

The scientific uncertainty and lack of conclusive evidence regarding the seriousness, extent, and effects of ozone depletion, as well as whether the threat even truly existed, all played a role in building the precautionary response the world took to the growing common concern.³⁸ This paved the way for the Montreal Protocol's status as the first true international precautionary approach to a global environmental danger.³⁹ While the Vienna Convention had acknowledged the "potentially harmful impact on human health and the environment through modification of the ozone layer," it had not put in place measures to address the problem.⁴⁰ The Montreal Protocol used the force of the growing international consensus that ozone depletion could be a very serious problem to spur protective actions.⁴¹ In this way, the principle of common concern and the precautionary principle served a fundamental role in influencing an international response to an environmental problem.

Another significant success of the Montreal Protocol is that it had to face and overcome not just scientific uncertainty, but also economic uncertainty. Most of the European Community supported very different regulations than the United States wanted, with both sides skeptical that either approach would have a meaningful impact.⁴² Closely tied with the economics of any regulations by the Montreal Protocol were the issues of equity and sovereignty. Each individual government

³⁶ See Bales, *supra* note 18, at 264 (explaining how "[o]zone depletion clearly affects all members of the international community," and the unilateral actions taken by one country cannot protect it from the potential harms); Thoms, *supra* note 3, at 799 (quoting James K. Sebenius, *Designing Negotiations Toward a New Regime: The Case of Global Warming*, 15 INT'L SECURITY 110, 119 (1991) and discussing how ozone depletion involves a "tragedy of the commons" problem, in which the "full costs of efforts to mitigate harmful emissions by one state will often be borne fully by that state, while the benefits of such actions are diffused throughout the global community").

³⁷ See Rio Declaration, *supra* note 9, princ. 7. The 1992 United Nations Conference on the Environment and Development was held in Rio de Janeiro, Brazil and is commonly referred to as the Rio Earth Summit. See S. Jacob Scherr & R. Juge Gregg, *Johannesburg and Beyond: The 2002 World Summit on Sustainable Development and the Rise of Partnerships*, 18 GEO. INT'L ENVTL. L. REV. 425, 429-30 (2006). One of the developments resulting from the meeting was Agenda 21, a 400-page outline for what nations and international organizations can do to protect the environment while also promoting sustainable development. *Id.*; see generally, e.g., Gary C. Bryner, *Implementing Global Environmental Agreements in the Developing World*, Y.B. COLO. J. INT'L ENVTL. L. & POL'Y 1 (1997) (discussing the implementation of four treaty regimes five years after the Rio Earth Summit).

³⁸ See BENEDICK, *supra* note 12, at 1 (emphasizing the significance of acting on "unproven scientific theories" to successfully negotiate the Montreal Protocol to control CFC production and use).

³⁹ See Elizabeth R. DeSombre, *The Experience of the Montreal Protocol: Particularly Remarkable, and Remarkably Particular*, 19 UCLA J. ENVTL. L. & POL'Y 49, 50 (2000-2001) (highlighting the impressive and successful precautionary approach to ozone depletion of the Montreal Protocol).

⁴⁰ Vienna Convention, *supra* note 21, pmbl.

⁴¹ See *supra* notes 16-19 and accompanying text.

⁴² See BENEDICK, *supra* note 12, at 4-6.

had its own national interests to consider; therefore, much of the debate regarding which regulatory approach to adopt was influenced by considerations of which would have a more unfavorable impact on respective national economies.⁴³ Parties did not want to put their own industries and economies at a competitive disadvantage due to the regulations imposed by the Montreal Protocol.⁴⁴ In particular, developing countries were very wary of the economic losses they would likely suffer as a result of stricter regulations.⁴⁵ As Mostafa Tolba, the UNEP executive director, said, “[t]he difficulties in negotiating the Montreal Protocol . . . [were] all who was going to get the edge over whom.”⁴⁶ Without available alternatives, national economies were left vulnerable to the regulation of ODSs due to their widespread use.

The Montreal Protocol also exemplified the precautionary principle, because it was designed to reduce worldwide production and use of ozone depleting substances before alternatives were readily available and when the demand for products containing ODSs was increasing.⁴⁷ Industry played a key role in this area as it was forced to shift from a position strongly opposing any and all regulation of CFCs and halons to one favoring reasonable global limits on the growth of production.⁴⁸ However, the lack of readily available alternatives needed to be addressed, since worldwide demand for products containing ODSs was increasing.⁴⁹ CFCs and halons were used in products that are practically synonymous with modern and developed standards of living, such as refrigerators and air conditioners.⁵⁰ Imposing and agreeing to regulations in the face of such circumstances was symbolic of the precautionary principle’s importance in the minds of both the developed and developing parties.

Another positive impact of the common concern and precautionary principles is that the principles truly facilitated and served as the foundation for the Montreal Protocol’s approach to state sovereignty and its use of common but differentiated responsibilities. Independence, creation, and enforcement of one’s own laws and legal system, and the control over one’s own resources are but a few examples of rights that states have based on the principle of state sovereignty.⁵¹ The regulatory route to address ozone depletion would necessarily infringe upon such rights. In

⁴³ See *id.* at 10–11, 14–15.

⁴⁴ See *id.* at 5.

⁴⁵ See Mossos, *supra* note 10, at 8 (explaining the developing countries’ concerns about access and affordability of new ozone-safe technologies as well as potential harmful effects on their economic growth due to the banning of ODSs).

⁴⁶ *Id.* at 15.

⁴⁷ See *id.* at 5, 7–8.

⁴⁸ See Morrisette, *supra* note 28, at 815–16.

⁴⁹ See *id.*

⁵⁰ See BENEDICK, *supra* note 12, at 1; McCabe, *supra* note 18, at 438 (noting that ODSs are used as aerosol propellants, refrigeration chemicals, and pesticides); Bales, *supra* note 18, at 265 (addressing uses of ODSs, such as in computer chip production and styrofoam); Thoms, *supra* note 3, at 798 n.5 (listing examples of industries impacted by ozone regulations from the Montreal Protocol as, *inter alia*, solvents, transportation, plastics, insulation, pharmaceuticals, and electronics).

⁵¹ See BLACK’S LAW DICTIONARY 1430 (8th ed. 2004) (defining sovereign state and sovereign people); Winston P. Nagan and Mario Santos, *Globalism from an African Perspective*, 17 *TRANSNAT’L L. & CONTEMP. PROBS.* 413, 429 (2008) (discussing the United Nation’s recognition of the “principle of state’s right to permanent sovereignty over its natural resources”).

order for the Montreal Protocol to succeed, it needed the cooperation, participation, and willingness to concede *some* sovereignty by many states.

The parties dealt with the regulatory infringements of state sovereignty by making the Montreal Protocol an extraordinarily flexible agreement. They created the flexibility in many ways, and ultimately it was essential as a means to bridge the differences between various states during the negotiation process.⁵² For example, the parties worked into the provisions of the Montreal Protocol mechanisms to re-evaluate and revise the Protocol in the future as new information (scientific, economic, environmental, or technical) became available.⁵³ As it turns out, most of the amendments served to strengthen the regulations and the treaty's approach to ODSs by changing the level of reductions and accelerating their timing.⁵⁴ This clear pattern of strengthening the Montreal Protocol through accelerated reductions and bans is further evidence of the cooperative nature of the Montreal Protocol, as well as the underlying strength of the principle of common concern built into the treaty. The pattern of accelerating the reductions and phase-outs was also due in large part to a new scientific discovery only about six months after the adoption of the Montreal Protocol. This study validated the theory of ozone depletion with hard evidence for the first time.⁵⁵ The breaking news greatly aided the willingness of the parties to amend and update the Montreal Protocol. Regardless, the ability to alter and adapt the Montreal Protocol to new breakthroughs ensured that it would be as current and effective as possible.

Another significant source of flexibility in the Montreal Protocol was the "basket approach" towards regulations. Each ODS was given an ozone depleting potential (ODP) rating, which was then used to calculate annual production, import, and export of the ODSs.⁵⁶ Then, states could calculate their consumption by subtracting their exports from their combined production and imports.⁵⁷ States' consumption was essentially a "basket" with an ODP limit, but states had the freedom to fill the "basket" any way they wished.⁵⁸ This system gave states additional flexibility in the implementation of the Montreal Protocol's provisions. Thus they were able to meet their own obligations in a variety of ways and could

⁵² See BENEDICK, *supra* note 12, at 16 (describing how governments favoring strong controls and those skeptical of ozone depletion were able to come to a compromise agreement by designing the protocol to be able to be reopened and revised as new scientific, economic, environmental, and technological advances became available).

⁵³ Montreal Protocol, *supra* note 1, art. 6.

⁵⁴ See Second Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, London, U.K., June 27–29, 1990, *Report of the Second Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer*, annexes I–III (June 29, 1990) [hereinafter London Amendment]; Adoption of Adjustments and Amendments by the Fourth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, Nov. 23–25, 1992, 32 I.L.M. 874; Ninth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, Can., Sept. 15–17, 1997, *Report of the Ninth Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer*, dec. IX/15 (Sept. 25, 1997).

⁵⁵ See BENEDICK, *supra* note 12, at 16 (discussing the significance of the Ozone Trends Panel Report, which released a new scientific assessment of the stratospheric ozone layer measurements that substantiated the theories of ozone depletion).

⁵⁶ Montreal Protocol, *supra* note 1, art. 3.

⁵⁷ *Id.*

⁵⁸ See BENEDICK, *supra* note 12, at 14.

therefore structure reductions around the specific needs of their own state. The basket approach is another example of the emphasis on cooperation during the negotiation process, because it avoided a divisive and difficult ODS-by-ODS negotiation process.⁵⁹

A great example of a state whose own interests differed greatly from many of the other parties is Japan, whose economy was very high-tech dependant.⁶⁰ Reductions of CFC-113, a common solvent in high-tech and electronics industries, would have had a much greater impact on the Japanese economy than other ODSs.⁶¹ With the basket approach, Japan could then reduce a greater percentage of other less economically important CFCs, while maintaining their greater use of more essential CFCs.⁶²

Perhaps one of the most critical elements of the Montreal Protocol's flexibility is the exemption of certain ODSs for certain uses. Parties can petition to have a certain use of an ODS be deemed an essential use, thereby exempting the production and consumption of the substance after the date of the phase-out that would otherwise be required.⁶³ The three categories of exemptions are the "critical uses of methyl bromide, essential uses for all other [ODSs], and laboratory and analytical uses."⁶⁴ This served to alleviate concerns by various states regarding the use of some ODSs for certain basic needs and further advanced both compliance and agreement.

The Montreal Protocol makes use of flexibility again with regard to trade of ODSs. It permits the trade of production allowances amongst party states, but generally not consumption allowances.⁶⁵ Trading production allowances makes it easier for low-producing states to still meet their domestic needs. As long as the trade is within the bounds of the production limits, parties are able to trade amongst each other relatively freely.⁶⁶ Since each state has its own production allowance, permitting states to trade part of that allowance does not increase the global ODS production levels. Instead, it facilitates state compliance with meeting the regulated levels without working adverse to the treaty's goals. The trade of consumption allowances, however, is generally not allowed because such trade would run contrary to the object and purpose of the Montreal Protocol, which is ultimately to eliminate the consumption of ODSs.⁶⁷ If countries are able to trade for more consumption allowances, then the incentive to phase-out and use less ODSs would

⁵⁹ See *id.* (noting that the basket approach offered additional flexibility for states and ultimately aided in gaining support for strong controls).

⁶⁰ See *id.*

⁶¹ See *id.*

⁶² *Id.* (discussing the flexibility that was generated by using the "ingenious" basket approach and its importance in gaining the support and participation of certain countries); see generally DAVID HUNTER ET AL., INTERNATIONAL ENVIRONMENTAL LAW AND POLICY 584 (3d ed. 2007) (providing background and a good overview of the world's approach to ozone depletion).

⁶³ Ozone Secretariat, United Nations Environment Program: Exemption Information, http://ozone.unep.org/Exemption_Information/ (last visited Jan. 25, 2009).

⁶⁴ *Id.*

⁶⁵ See Montreal Protocol, *supra* note 1, art. 2, para. 5; UNEP, HANDBOOK FOR THE MONTREAL PROTOCOL ON SUBSTANCES THAT DEplete THE OZONE LAYER (2006), http://ozone.unep.org/Publications/MP_Handbook/Section_1.1_The_Montreal_Protocol/Article_2.shtml (last visited Jan. 25, 2009)

⁶⁶ See Montreal Protocol, *supra* note 1, art. 2, para. 5.

⁶⁷ See *id.* pmb1; UNEP, *supra* note 65.

diminish significantly. The toughest trade restrictions came in regards to trade between parties and nonparties. Importation by parties *from* nonparties had to be gradually ceased, and exportation *to* nonparties by parties was banned entirely.⁶⁸ These strict measures served to provide states with the incentive to join the Montreal Protocol rather than abstain from it in an attempt to gain a competitive advantage. Protecting the economic and competitive interests of the parties to the Montreal Protocol was essential to gain widespread support and membership. Without such protection, national economic interests might be too strong and too important for countries to give up their sovereign rights to protect and provide their citizens with fair economic opportunity. The message was clear: parties to the Montreal Protocol would enjoy its flexibility, but nonparties would face tough competitive obstacles.

The flexibility of the Montreal Protocol, a major strength in and of itself, comes from many sources and has helped to increase both cooperation and participation. As of January 28, 2009, 193 countries have ratified the Montreal Protocol,⁶⁹ and each one of them had to give up a little bit of their sovereignty to do so. This could not have been possible without the remarkable flexibility of the terms of the Montreal Protocol itself, especially since each party is required to annually report their production and consumption of regulated substances.⁷⁰

Persuading developing countries (the “South”) to give up some of their sovereignty and sign on to the Montreal Protocol was particularly difficult, even with the utilization and incorporation of flexibility into its provisions.⁷¹ Due in part to the historical colonization of much of the world at the hands of the developed countries (the “North”), the South resisted surrendering yet again sovereignty and control over how they used their own resources.⁷² Additionally, since the production and consumption of CFCs had greatly aided the industrialization and development of the North, the developing states argued that they too should be allowed the same benefits from the ODSs, especially since the current problem was due in large part to the

⁶⁸ See Robert W. Hahn & Albert M. McGartland, *The Political Economy of Instrument Choice: An Examination of the U.S. Role in Implementing the Montreal Protocol*, 83 NW. U. L. REV. 592, 596 (1989) (explaining the trade regulations facing parties to the Montreal Protocol and discussing the reasoning behind the tough trade policies imposed against nonparties).

⁶⁹ Ozone Secretariat, Status of Ratification, http://ozone.unep.org/Ratification_status/ (last visited Jan. 25, 2009).

⁷⁰ See Mossos, *supra* note 10, at 20 (discussing the many ways that flexibility was drafted into the Montreal Protocol).

⁷¹ See KAREN T. LITFIN, OZONE DISCOURSES: SCIENCE AND POLITICS IN GLOBAL ENVIRONMENTAL COOPERATION 176 (1994).

⁷² See Bing Ling, *Developing Countries and Ozone Layer Protection: Issues, Principles and Implications*, 6 TUL. ENVTL. L.J. 91, 96–97, 99–100 (1992); Michael Weisslitz, Comment, *Rethinking the Equitable Principle of Common but Differentiated Responsibility: Differential Versus Absolute Norms of Compliance and Contribution in the Global Climate Change Context*, 13 COLO. J. INT’L ENVTL. L. & POL’Y 473, 488 (2002) (discussing the concerns of developing nations during the adoption of the Kyoto Protocol about whether the treaty would impose obligations on them that would result in either inability to combat poverty or some sort of recolonization at the hands of the developed world).

developed world.⁷³ This idea had recently been endorsed by the United Nations General Assembly through the 1986 Declaration on the Right to Development.⁷⁴

Considering the international response to ozone depletion that was required and the developing world's goals of development, a compromise had to be reached. Especially since over time, due to large and still rapidly growing populations, developing countries threatened to undermine and render ineffective the Montreal Protocol if they were not included.⁷⁵ The result of the compromise was an early example of the developing principle of common but differentiated responsibilities. The Montreal Protocol's original version clearly states that the parties acknowledge "that special provision is required to meet the needs of developing countries" for ODSs.⁷⁶ Initially this consisted of providing developing countries with a ten year grace period before they were required to start phasing out ODSs as well as the promise to address financial and technological assistance at the next meeting in 1990.⁷⁷ Twenty years after the adoption of the Montreal Protocol, the developing parties have reduced their use of ODSs by over eighty percent.⁷⁸

Another important aspect and advancement in the development of a proper interpretation and understanding of the principle of common but differentiated responsibilities came from the 1990 London Amendment to the Montreal Protocol.⁷⁹ The international community took a landmark step in the development of the principle of common but differentiated responsibilities when it finally addressed the issues of financing and technology transfer necessary for compliance to be realistically feasible for much of the developing world.⁸⁰ The parties created the innovative and necessary mechanism to implement the technology transfer and financial funding between the developed and developing parties, called the Multilateral Fund for the Implementation of the Montreal Protocol (Multilateral Fund).⁸¹ This mechanism was an innovative strategy to aid the developing parties in acquiring the new and necessary technologies to reduce their ozone depleting emissions, thereby increasing their compliance with the control measures of the

⁷³ See Weisslitz, *supra* note 72, at 480–81 (noting the Montreal Protocol used the equitable approach of "differential standards for developed and developing states" because of economic concerns and notions of the developed states' historic culpability for environmental harm).

⁷⁴ 1986 Declaration on the Right to Development, G.A. Res. 41/128, annex, U.N. Doc. A/RES/41/128 (Dec. 4, 1986) [hereinafter 1986 Declaration].

⁷⁵ See BENEDICK, *supra* note 12, at 22 (addressing the economic and structural inequalities between the North and the South and the potential future effect on the regime's effectiveness to combat ozone depletion).

⁷⁶ Montreal Protocol, *supra* note 1, pmb1.

⁷⁷ *Id.* arts. 5, 10, para. 3; see also Mossos, *supra* note 10, at 13 (discussing the driving forces behind the adoption of the Montreal Protocol and the important compromises the negotiating parties reached to bridge the divide between the positions of developed and developing nations).

⁷⁸ SEC'Y-GEN., UNITED NATIONS, MESSAGE ON THE INTERNATIONAL DAY FOR THE PRESERVATION OF THE OZONE LAYER (2007), available at <http://www.uneptie.org/ozonAction/information/mmcfiles/4870-e-sgmsg.pdf>.

⁷⁹ London Amendment, *supra* note 54.

⁸⁰ *Id.* annex II, art. 10.

⁸¹ See *id.*; Mossos, *supra* note 10, at 17 (detailing the creation and the implementation of the Montreal Protocol's Multilateral Fund).

Montreal Protocol.⁸² However, it presented numerous issues surrounding the equitable terms of such financial aid. Developed countries were concerned both with the proportionality of monetary contributions from each developed party, as well as with the precedent such a mechanism would set for future international environmental negotiations.⁸³ Developing countries were concerned that complying with the regulations of the Montreal Protocol was unjust and would hinder their own development after the developed world had benefited from unrestricted use of ozone depleting substances in its development.⁸⁴ Also, there was much reluctance by the developed countries to contribute to the fund at all due to concerns that the money would not go towards advancing the goals of the Montreal Protocol.⁸⁵

The provisions of the Multilateral Fund are particularly unique in the ways that they address these equitable issues. For example, the Multilateral Fund sought to clearly define the financial and technological aid that would be available (for the certainty and benefit of both developed and developing parties). To do this, it specified that assistance would not be open-ended and would only cover the incremental costs incurred by developing countries in the development of technologies and projects that will permit developing countries to fulfill their obligations under the Montreal Protocol.⁸⁶ The London Amendment defined incremental costs as including such expenses as the costs of conversion to ozone-safe substitutes for existing technologies and facilities, the costs of establishing new production facilities, the costs of conversion of existing equipment, and the costs of research to adapt new technology to local conditions.⁸⁷ This ultimately gave assurances to the developed countries that their contributions would be spent properly in the advancement of the object and purpose of the Montreal Protocol.

Additionally, though the Multilateral Fund represented an acknowledgement by the developed world that they had contributed disproportionately to the problem of ozone depletion as well as benefited from unregulated use of ODSs, it did not include an acknowledgment of liability by developed parties for any damage resulting from ozone depletion.⁸⁸ This was an important success for the developed countries, because many from the North feared that providing financial support and acceptance of the principle of common but differentiated responsibilities would ultimately be viewed as an acknowledgement of liability for the problems and consequences of ozone depletion.⁸⁹ This might in turn lead to the developing world seeking reparations from the North for damages sustained from consequences of

⁸² See BENEDICK, *supra* note 12, at 18 (providing a general overview of the innovative and unique mechanisms, such as the Multilateral Fund, and features drafted into the Montreal Protocol to assist both developed and developing states with their compliance with obligations under the protocol).

⁸³ See Mossos, *supra* note 10, at 16–17 (highlighting the significance and historical precedence of the Multilateral Fund's successful means to provide developing parties to the Montreal Protocol with the financial support and technological transfer necessary for them to adhere to their obligations).

⁸⁴ See Ling, *supra* note 72, at 96–97; Weisslitz, *supra* note 72, at 480–81.

⁸⁵ See CLARK, *supra* note 5, at III.2.C.

⁸⁶ See *id.* (discussing briefly the principle aspects of the Multilateral Fund).

⁸⁷ London Amendment, *supra* note 54, annex IV, app. I, para. 2.

⁸⁸ See CLARK, *supra* note 5, at III.2.C (highlighting a key element leading to the Multilateral Fund was the developed countries' acknowledgement that they had both benefited from ODSs and disproportionately contributed to ozone depletion).

⁸⁹ See *id.*

ozone depletion. However, cooperation again played a major role in getting both developed and developing nations to put the liability issue aside and instead embrace and preserve the general nature of the principle and the idea of *common* responsibilities. As of 2008, the Multilateral Fund has used over \$2.3 billion to finance the implementation of about 5900 projects in 147 developing countries.⁹⁰

Another critical characteristic of the Montreal Protocol's application of the common but differentiated responsibilities principle is that it not only helped the treaty's effectiveness as a whole, but also ensured that a worldwide reduction of ODSs would occur. This created a much needed certainty for industries that the market for ODSs would be diminishing and eventually eliminated.⁹¹ Such assurances meant that investments in the research and development of alternatives to ozone depleting substances and technologies would be financially sound investments.⁹² While the Montreal Protocol itself served as the mechanism for providing the necessary economic and regulatory incentives to develop and market suitable alternatives, the inclusion of all parties reinforced those incentives. The inclusion of developing countries, even with the ten year grace period, meant that it was not financially advantageous for companies and producers of ODSs to move to developing countries to escape the regulations of the North. If they chose to move abroad, then they would still meet those same regulations after that grace period was over, but the companies that stayed behind would have the competitive advantage of a headstart on developing, producing, and marketing alternatives. Further, industry involvement significantly aided the effectiveness of the Multilateral Fund, since most of the ozone safe technology that had to be transferred to the developing world was owned by the private sector and not by the developed parties of the Montreal Protocol.⁹³ Companies were presented with the choice to either continue in a dwindling market, or to adapt and enter a new emerging market—the market for ODS alternatives. This new market was wide open and the financial incentives to get into the market quickly were great. In the end, gaining industry involvement and cooperation was a crucial step in the development and implementation of the Montreal Protocol, and truly helped to turn around the problem of ozone depletion.⁹⁴

The Montreal Protocol was a revolutionary international legal and environmental agreement. It bridged the North/South divide better than perhaps any other treaty. Its success is quite evident as it successfully reduced the global production, consumption, and emission of ODSs, and scientists now predict the replenishment of the ozone layer sometime between 2050 and 2075.⁹⁵ The Montreal Protocol has helped spread ozone-safe technology around the world and

⁹⁰ The Multilateral Fund for the Implementation of the Montreal Protocol, <http://www.multilateralfund.org> (last visited Jan. 27, 2009).

⁹¹ See Thoms, *supra* note 3, at 810 (discussing the effect of setting firm targets and timetables for the reductions of ODSs).

⁹² See *id.*

⁹³ See CLARK, *supra* note 5, at III.2.A (highlighting the critical role the chemical industry played in the implementation of the technology transfer mechanism of the Montreal Protocol).

⁹⁴ See *id.* (asserting that “[w]ere it not for the acceptance of the chemical industry . . . the Montreal Protocol would not have been possible”).

⁹⁵ UNEP, *supra* note 33.

continues to adapt as scientific knowledge progresses.⁹⁶ Upon evaluation of the effectiveness of the Montreal Protocol, one must recognize the fundamental roles played by the proper and efficient approach to and interpretation of such international environmental law principles as common concern, the precautionary principle, state sovereignty, and common but differentiated responsibilities. Each international environmental problem is unique, but broad use of the interpretations and methods set forth in the Montreal Protocol can enhance the effectiveness of other international treaties.

III. CLIMATE CHANGE

A. Background

As concerns rapidly grew over ozone depletion in the 1980s, concerns also emerged over greenhouse gas emissions harming the atmosphere and inducing the Earth's climate to change.⁹⁷ The issue has been a spark for controversy all along the way.⁹⁸ That the climate is warming is now generally accepted, but debate continues as to whether the warming is directly attributable to humans.⁹⁹ Much of the scientific community believes that the global warming trend is affected by human activities, but, as was the case with ozone depletion, uncertainty exists as to the extent that human activities are affecting and influencing the climate as well as to many details of the threat, possible solutions, and potential effects.¹⁰⁰

⁹⁶ See *id.*; Montreal Protocol, *supra* note 1, art. 6.

⁹⁷ See Sunstein, *supra* note 4, at 23 (comparing the concerns over ozone depletion with those of climate change).

⁹⁸ See generally David W. Childs, *The Unresolved Debates that Scorched Kyoto: An Analytical Framework*, 13 U. MIAMI INT'L & COMP. L. REV. 233 (2005) (presenting the arguments of both proponents and skeptics of anthropogenic global warming); Carlarne, *supra* note 5, at 438 (noting that the United States especially has regularly challenged the legitimacy and authenticity of global climate change). Compare Anita M. Halvorssen, *Common, but Differentiated Commitments in the Future Climate Change Regime—Amending the Kyoto Protocol to Include Annex C and the Annex C Mitigation Fund*, 18 COLO. J. INT'L ENVTL. L. & POL'Y 247, 248 (2007) (arguing that climate change is becoming more certain and more of a threat), with MARLO LEWIS, JR., COMPETITIVE ENTER. INST., AL GORE'S SCIENCE FICTION: A SKEPTIC'S GUIDE TO AN INCONVENIENT TRUTH, available at <http://cei.org/pdf/5820.pdf> (arguing that climate change is not a real and credible threat).

⁹⁹ See Childs, *supra* note 98, at 235–36.

¹⁰⁰ *Id.* at 236–37; see also Kevin A. Baumert, Note, *Participation of Developing Countries in the International Climate Change Regime: Lessons for the Future*, 38 GEO. WASH. INT'L L. REV. 365, 369 (2006) (noting the uncertainties of the localized effects of climate change—specifically the costs and benefits of reducing greenhouse gas emissions); Anita M. Halvorssen, *The Kyoto Protocol and Developing Countries—The Clean Development Mechanism*, 16 COLO. J. INT'L ENVTL. L. & POL'Y 353, 356 (2005) (noting that “[m]ost scientists believe anthropogenic activity has influenced” the global warming trend); Carlarne, *supra* note 5, at 435 (observing that much of the current climate change research focuses on, inter alia, the existence of global climate change); Thoms, *supra* note 3, at 812 (noting that “[t]he extent of effects caused by climate change is unclear”); see generally Senator Frank H. Murkowski, *The Kyoto Protocol is Not the Answer to Climate Change*, 37 HARV. J. ON LEGIS. 345 (2000) (discussing the uncertainty of climate change and the effects on policy development).

Carbon dioxide, both a naturally occurring gas as well as an anthropogenic one, takes much of the blame for climate change through the greenhouse effect.¹⁰¹ The greenhouse effect refers to how concentrations of greenhouse gases, such as carbon dioxide, trap heat inside the atmosphere close to the earth's surface while still allowing sunlight to pass through it.¹⁰² Predictions of the consequences of the greenhouse effect include rising sea levels, heightened strength of weather patterns, adverse effects on ecosystems and wildlife due to loss of habitat, and increased difficulty and potential inability to raise crops.¹⁰³ As with ozone depletion, such dire possible effects catch the attention of the general public and increase both awareness and concern of the problem. Despite increasing public awareness, climate change has not benefited from an "ozone hole" type of scientific discovery to "shock the world into taking action."¹⁰⁴

With the noteworthy levels of state cooperation and the overall positive sentiments from the successful negotiation of the Montreal Protocol still present in the international community, the United Nations General Assembly declared in 1988 that climate change was a "common concern of mankind."¹⁰⁵ This was followed four years later by the adoption of the Framework Convention on Climate Change (Climate Change Convention), which served a similar purpose as the Vienna Convention.¹⁰⁶ As the Vienna Convention had done with ozone depletion, the Climate Change Convention provided for increased information sharing and research,¹⁰⁷ as well as provided the framework for the development of an international regulatory approach at a later date. It also declared the rather abstract and vague objective of stabilizing "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system" by returning to earlier levels of such emissions by the end of the decade.¹⁰⁸ This was an obvious utilization of the precautionary principle, as the drafters believed the situation was such that the stakes were too high to wait for

¹⁰¹ Jasmine Abdel-khalik, Note, *Prescriptive Treaties in Global Warming: Applying the Factors Leading to the Montreal Protocol*, 22 MICH. J. INT'L L. 489, 492 (2001) (describing how atmospheric carbon dioxide levels compare since the industrial revolution with levels prior to industrialization). "Anthropogenic" emissions refers to human-induced or human caused greenhouse gas emissions. See, e.g., Janine Maney, *Carbon Dioxide Emissions, Climate Change, and the Clean Air Act: An Analysis of Whether Carbon Dioxide Should Be Listed as a Criteria Pollutant*, 13 N.Y.U. ENVTL. L.J. 298, 303 n.12 (2005) (discussing further the definition and meaning of "anthropogenic" in the context of climate change).

¹⁰² See Solomon & Freedberg, *supra* note 18, at 84; Childs, *supra* note 98, at 236.

¹⁰³ See Childs, *supra* note 98, at 240 (discussing hypothesized effects and results of climate change as predicted by global climate models of the United Nations Intergovernmental Panel on Climate Change, specifically predicting that developing countries will have the most trouble adjusting to changes).

¹⁰⁴ Thoms, *supra* note 3, at 836.

¹⁰⁵ See Sunstein, *supra* note 4, at 24 (citing a 1988 resolution of the United Nations General Assembly that first gave climate change the designation of a "common concern of mankind").

¹⁰⁶ United Nations Framework Convention for Climate Change, May 9, 1992, S. Treaty Doc. No. 102-38, 1771 U.N.T.S. 107 [hereinafter Climate Change Convention].

¹⁰⁷ See, e.g., *id.* art. 4, para. 1.

¹⁰⁸ *Id.* art. 2.

certainty before taking action.¹⁰⁹ Also aiding the application of the precautionary principle to climate change was the widespread view among scientists that regardless of the skepticism and uncertainty of anthropogenic effects on climate, becoming more energy efficient was a sound and advantageous idea that would benefit the world.¹¹⁰ These many factors came together to help prompt the creation of the Kyoto Protocol. This treaty acted upon the framework created by the Climate Change Convention to set mandatory regulatory limits on greenhouse gas emissions for the developed countries of the world. The treaty marked a turning point in the international community's climate change regime, because it represented the first substantive approach to the issue.

B. The Kyoto Protocol

After several meetings of parties to the Climate Change Convention, the Kyoto Protocol was finally adopted in 1997 to substantively address the issue of climate change.¹¹¹ With commitments running only until 2012,¹¹² this is a short-sighted agreement to serve as the first stage in addressing the issue of climate change. In a nutshell, the Kyoto Protocol is an agreement that binds developed countries to reduce their greenhouse gas emissions in an effort to reduce anthropogenic effects on the atmosphere.¹¹³ However, its success and effectiveness are severely limited because several developed states, most notably the United States, are not parties to the treaty and because developing states are not held to any emissions regulations.¹¹⁴

In terms of regulations and control measures, the Kyoto Protocol's goal is to reduce global greenhouse gas emissions by an average of five percent below 1990 levels.¹¹⁵ However, each developed nation has its own target percentage for emission reductions, and some industrialized countries, such as Australia, are permitted to increase their emissions.¹¹⁶ The reasoning behind this variation from country to country stems from the nature of the climate change problem being a common concern of mankind.¹¹⁷ Ultimately, since one state's unilateral actions will not alone solve the problem, what matters is that, collectively, the average

¹⁰⁹ See Childs, *supra* note 98, at 241 (outlining the arguments of proponents of the anthropogenic global warming theory that led to the adoption of the Climate Change Convention and Kyoto Protocol, both precautionary devices to address climate change).

¹¹⁰ *Id.* at 246 (describing how many scientists that are skeptical of the anthropogenic global warming theory believe scientific data has not advanced to a point that it can link human activities with climate change and that reductions of anthropogenic greenhouse gases therefore would not affect climate change, but noting that this skepticism does not keep most scientists from favoring the development and use of more efficient energy sources).

¹¹¹ Kyoto Protocol, *supra* note 2.

¹¹² *Id.* art. 3, para. 1.

¹¹³ See Childs, *supra* note 98, at 246–49; Kyoto Protocol, *supra* note 2.

¹¹⁴ See generally Baumert, *supra* note 100 (discussing participation of developing countries in international climate change efforts).

¹¹⁵ Kyoto Protocol, *supra* note 2, art. 3, para. 1.

¹¹⁶ *Id.* art. 3, para. 1, annex B.

¹¹⁷ See, e.g., Halvorssen, *supra* note 100, at 359 (noting that “climate change is a global issue that needs to be tackled by all nations”); Sunstein, *supra* note 4, at 2.

emissions decline.¹¹⁸ This makes the exclusion of developing nations from participation in the five percent average reduction and the allowance of their unrestricted growth and increased emissions that much more puzzling.

The net anthropogenic greenhouse gas emissions are calculated based on their global warming potential (GWP).¹¹⁹ The Kyoto Protocol quotas take into account all greenhouse gas emissions, except those gases regulated by the Montreal Protocol.¹²⁰ Also, while it takes into account the destruction of carbon sinks, the Kyoto Protocol does not fully account for their creation and increasing use.¹²¹ Carbon sinks are ways, such as forests, that nature sequesters carbon dioxide.¹²² Better accounting for carbon sink creation, such as reforestation, was a demand strongly held by the United States, Australia, Canada, and Japan during the negotiation process.¹²³ Carbon sink creation through planting trees and similar efforts does help reduce greenhouse gas emissions, yet countries do not get full credit for all such projects.¹²⁴ While the system for reductions attempts to emulate the Montreal Protocol, it falls short of providing parties with the same flexibility and fairness in meeting their obligations that the Montreal Protocol had done so effectively.

The overall lack of flexibility, including the initial lack of providing credit for the use of carbon sinks to reduce greenhouse gas emissions, was one of the reasons the United States did not support the Kyoto Protocol.¹²⁵ In an effort to provide the parties with flexibility, three mechanisms assist the developed states with compliance: Joint Implementation, Emissions Trading, and the Clean Development Mechanism.¹²⁶ These mechanisms, however, were not intended to be used by the parties as the primary means to reduce emissions and meet obligations.¹²⁷

The Joint Implementation mechanism provides developed states with the option to finance a project in another developed state that will reduce the emissions in that country, but credit for the reduction goes to the financing country.¹²⁸ This allows states more flexibility in their approach to their obligated reductions,

¹¹⁸ See Baumert, *supra* note 100, at 372–73 (discussing the varying targets for emissions and the average reduction of about five percent below 1990 emissions levels).

¹¹⁹ Kyoto Protocol, *supra* note 2, art. 3, para. 1, art. 5, para. 3.

¹²⁰ *Id.* art. 5, para. 1.

¹²¹ See Abdel-khalik, *supra* note 101, at 519 (stating that one of the two demands of the “Umbrella Group”—comprised of the United States, Japan, Australia, and Canada—was that increased use of carbon sinks “count” towards emission reductions).

¹²² See *id.* at 492 (discussing the main sources of carbon dioxide emissions and comparing carbon sinks to the burning of fossil fuels). Carbon sinks are natural forms of carbon sequestration, or removal of carbon from the atmosphere. Trees and plants take in carbon dioxide and incorporate it into their cell mass. This helps reduce the level of carbon dioxide in the atmosphere. See Stephanie B. Ohshita, *The Scientific and International Context for Climate Change Initiatives*, 42 U.S.F. L. REV. 1, 21–22 (2007).

¹²³ Abdel-khalik, *supra* note 101, at 519 (outlining the demands of the United States, Canada, Japan, and Australia to account for carbon sink creation as well as emissions trading, both of which would increase the Kyoto Protocol’s flexibility).

¹²⁴ See *infra* text accompanying notes 138–39.

¹²⁵ See Abdel-khalik, *supra* note 101, at 519.

¹²⁶ See Ohshita, *supra* note 122, at 20–21 (explaining the various mechanisms in the Kyoto Protocol).

¹²⁷ See Halvorsen, *supra* note 98, at 256–57 (outlining the three market-based mechanisms in the Kyoto Protocol and how they fit into the protocol’s interpretation and application of the principle of common but differentiated responsibilities).

¹²⁸ Kyoto Protocol, *supra* note 2, art. 6.

because they have the option to reduce emissions in another state as opposed to their own. For example, a state might replace a coal-fired power plant with a natural gas power plant in another country; it would then get credit for the reduced amount of greenhouse gas emissions resulting from the replacement.¹²⁹ This mechanism is particularly beneficial for the large economies that are also leading greenhouse gas emitters because financing projects abroad is cheaper and therefore limits the impact of emission reductions on their own domestic economy.¹³⁰ The Joint Implementation mechanism is limited in that domestic reductions remain the primary source of efforts to comply with reduction obligations, while reductions via Joint Implementation are to be merely “supplemental to domestic actions.”¹³¹

Like the Joint Implementation mechanism, the Emissions Trading system provided for in the Kyoto Protocol is designed to assist developed countries in complying with their obligations.¹³² The idea is for the system to “work like a commodities exchange,” where developed countries buy and sell emissions credits or allowances.¹³³ In this way, public and private entities alike will have an incentive to develop and invest in clean technologies to improve their energy efficiency; the more efficient they become, the more credits they have available to sell or the fewer credits they have to buy from others.¹³⁴ The Emissions Trading system is also limited to a supplemental role for reducing emissions behind domestic actions.¹³⁵

The only flexibility mechanism that includes the participation of developing countries is the Clean Development Mechanism, whose purpose is to increase sustainable development in the developing world so as to advance the object and purpose of the protocol.¹³⁶ This mechanism promotes technology transfer by giving emissions credits to developed countries that finance projects in developing countries that result in improved energy efficiency and reduced emissions.¹³⁷ Similar to the Joint Implementation mechanism, a developed country replacing a coal power plant with a natural gas plant would be considered a valid project to achieve emissions credits. The difference would be that the country in which the project took place would be a developing country under the Clean Development Mechanism instead of a developed one under Joint Implementation.

Part of the controversial treatment of carbon sink creation, referred to previously, related to the Clean Development Mechanism. The controversy centered on whether or not to use reforestation as a valid project under the Clean Development Mechanism, and if so, to what extent they could be used.¹³⁸ In the

¹²⁹ Halvorssen, *supra* note 100, at 364.

¹³⁰ See Ohshita, *supra* note 122, at 21 (discussing the incentives for wealthy industrialized nations to use the flexibility mechanisms of the Kyoto Protocol).

¹³¹ Kyoto Protocol, *supra* note 2, art. 6, para. 1(d).

¹³² See *id.* art. 17.

¹³³ Halvorssen, *supra* note 100, at 363.

¹³⁴ See *id.*

¹³⁵ Kyoto Protocol, *supra* note 2, art. 17.

¹³⁶ *Id.* art. 12, para. 2; Halvorssen, *supra* note 100, at 364.

¹³⁷ Kyoto Protocol, *supra* note 2, art. 12, para. 10; see also Baumert, *supra* note 100, at 373 (contrasting briefly two of the Kyoto Protocol’s market mechanisms, international emissions trading and the Clean Development Mechanism).

¹³⁸ See Halvorssen, *supra* note 100, at 366 (detailing the limits imposed on the accounting of carbon sink creation for emission credits under the Clean Development Mechanism).

end, a compromise was reached and carbon sink creation through reforestation was considered an acceptable Clean Development Mechanism project, but such projects cannot exceed five times one percent of the base year emissions for the developed country.¹³⁹ This limit is unfortunate because it eliminates—or at a minimum, severely decreases—the incentive to create carbon sinks after it is reached. Nevertheless, at the signing of the protocol, the Clean Development Mechanism was one of the “most celebrated provisions,” thanks to its sheer potential and expectations for providing lower cost environmental benefits.¹⁴⁰

Another reason the United States refused to join the agreement is that the reduction commitments are exclusively set for developed countries.¹⁴¹ Developing states are encouraged to make voluntary cuts, but there is little incentive to do so.¹⁴² Any actual reductions by developing states tend to come from the Clean Development Mechanism. The exclusion of developing countries from mandatory cutbacks and thereby active participation in responding to the threat of climate change is one of the most contentious elements of the Kyoto Protocol.¹⁴³

Though encouraged to do so, developing states resisted making even voluntary commitments.¹⁴⁴ In their view, the issues of development and the eradication of poverty took priority to environmental concerns, and economic growth through expanded use of fossil fuels is a primary strategy for accomplishing those goals.¹⁴⁵ Evidence of the strong feelings and resolve of the developing nations towards the exclusion of commitments on their part was exhibited when one of their delegates made the statement that “no protocol is better than a protocol with new developing country commitments.”¹⁴⁶ The cooperative attitudes of the parties that so greatly benefited the Montreal Protocol negotiations had dissipated into two polarized positions. In the end, the developed states compromised and, in order to finalize the protocol, excluded the developing world from mandatory obligations.

¹³⁹ Conference of the Parties to the United Nations Framework Convention on Climate Change and Kyoto Protocol, Marrakesh, Morocco, Oct. 29–Nov. 10, 2001, *Report of the Conference of the Parties on its Seventh Session*, add., vol. II, dec. 17/CP.7, para. 7(a)–(b), U.N. Doc. FCCC/CP/2001/13/Add.2 (Jan. 21, 2002).

¹⁴⁰ See Baumert, *supra* note 100, at 387.

¹⁴¹ See Sunstein, *supra* note 4, at 26–28 (discussing the negotiations of the Kyoto Protocol and the positions of various parties, specifically evaluating the factors affecting the United States’s position that it would only ratify the treaty if it included meaningful participation of developing nations).

¹⁴² See *id.*

¹⁴³ See, e.g., Baumert, *supra* note 100, at 366 (noting that one of the most common criticisms of the Kyoto Protocol is its failure to include developing countries in its binding regulations).

¹⁴⁴ Weisslitz, *supra* note 72, at 484 (discussing the fears and reasons leading to the rejection of voluntary commitments by developing nations during the negotiations of the Kyoto Protocol).

¹⁴⁵ See *id.* at 488 (noting the primary focus of developing nations is poverty eradication, with basic necessities “taking priority over social and aesthetic needs”); Halvorsen, *supra* note 98, at 254 (explaining the reasoning behind the principle of common but differentiated responsibilities, particularly the role poverty eradication plays).

¹⁴⁶ See Paul G. Harris, *Common But Differentiated Responsibility: The Kyoto Protocol and United States Policy*, 7 N.Y.U. ENVTL. L.J. 27, 34 (1999) (noting the firm stance of the developing nations during the negotiation of the Kyoto Protocol) (quoting Paola Bettelli et al., *Highlights from the Meetings of the FCCC Subsidiary Bodies*, EARTH NEGOTIATIONS BULLETIN, Oct. 24, 1997, <http://www.iisd.ca/download/asc/enb1260e.txt> (last visited Jan. 25, 2009)).

Perhaps the biggest reason the United States rejected the Kyoto Protocol is the estimated economic harm that it would do to the U.S. economy.¹⁴⁷ As a leading emitter of greenhouse gases, reductions would surely hit the United States hard.¹⁴⁸ Increased costs for energy would likely result in increased prices for American citizens, which would put the U.S. economy at a competitive disadvantage when developing states are expanding their economies unchecked.¹⁴⁹ As long as there are significant charges of inequity in regards to the harmful effects the implementation of the Kyoto Protocol will have on various states and economies, it will have limited success. Further, realistically, an international regime to address climate change will be ineffective without the participation of the United States.¹⁵⁰

IV. RECOMMENDATIONS FOR IMPROVING THE INTERNATIONAL APPROACH TO CLIMATE CHANGE

Much can be learned from the differences in the approach to ozone depletion and the approach to climate change. If one focuses not on the specifics of the problems, but takes a broad view, then there are some important lessons from the Montreal Protocol that should be applied to the international response to climate change.¹⁵¹ Specifically, proper interpretation and better application of the principles of state sovereignty and common but differentiated responsibilities would greatly strengthen the Kyoto Protocol and the next major international effort to confront climate change.

A. State Sovereignty

While the Kyoto Protocol attempted to follow the Montreal Protocol's "basket approach," it failed to incorporate one of the most important aspects of flexibility of the basket approach—the inclusion of all known causes contributing or suspected of contributing to the potential threat.¹⁵² The Montreal Protocol showed that flexibility in an international agreement, particularly an environmental one acting on the precautionary principle, was essential to minimize the amount of state

¹⁴⁷ See, e.g., Sunstein, *supra* note 4, at 30–35 (discussing the costs and benefits for the United States of accepting the binding obligations of the Kyoto Protocol); Murkowski, *supra* note 100, at 353–57 (noting that economic assessments of the effect of the Kyoto Protocol differ depending on the economic assumptions made in the study itself, but concluding that the Kyoto Protocol would weaken the U.S. economy).

¹⁴⁸ See Halvorsen, *supra* note 98, at 250 (noting that the United States accounts for a quarter of the world's greenhouse gas emissions); Murkowski, *supra* note 100, at 353–57.

¹⁴⁹ See Murkowski, *supra* note 100, at 353–57 (discussing the potential adverse consequences on the U.S. economy and standard of living if the regulations of the Kyoto Protocol were implemented in the United States despite the participation of developing countries).

¹⁵⁰ Richard B. Stewart & Jonathan B. Wiener, *Practical Climate Change Policy*, ISSUES IN SCI. & TECH. ONLINE, Winter 2003, <http://www.issues.org/20.2/stewart.html> (last visited Jan. 25, 2009) (“Without the United States and China, the Kyoto regime will amount to little.”).

¹⁵¹ However, it is important to note that some significant differences exist between the two issues. The magnitude and scale of the threat in relation to the effect on everyday life is significantly greater for climate change. See Sunstein, *supra* note 4, at 5 (concluding that the economic implications of the Kyoto Protocol as a response to climate change presented a “radically different picture” than the Montreal Protocol and ozone depletion).

¹⁵² See *supra* note 120 and accompanying text.

sovereignty parties had to surrender.¹⁵³ The basket approach allowed for increased flexibility largely in two ways. First, rather than specify an exact amount of reductions for each ODS, the Montreal Protocol set an overall quota that could be met in a variety of ways at the discretion of each party.¹⁵⁴ Second, the Montreal Protocol included all known or suspected ODSs and contributing causes to ozone depletion in the calculation of those quotas.¹⁵⁵ This gave parties the important flexibility to meet their quotas in many different ways, using reductions of various substances. Knowing that the control measures provided for the protection of state sovereignty by leaving up to each state the decision of how to fill the “basket,” it increased state participation and willingness to obligate themselves to the provisions.¹⁵⁶ The same is not true for the Kyoto Protocol.

The Kyoto Protocol’s attempt at the basket approach is inherently flawed. While it allows for a “basket” of greenhouse gases that can be filled in a variety of ways, it also does not take into account all known greenhouse gases.¹⁵⁷ This confines the effectiveness of the treaty, because the flexibility offered to states in their pursuit of compliance with the regulations is limited by not being able to factor and count reductions of greenhouse gases that are also ODSs.¹⁵⁸ For example, it specifically excludes ozone depleting substances that are regulated by the Montreal Protocol, even though most ODSs are also greenhouse gases.¹⁵⁹ If the Kyoto Protocol factored ozone depleting substances into the “basket” of emissions, then this would provide more incentives for countries to be aware of the GWP of the substances involved in the addressing ozone depletion.

Based on lessons from ozone depletion, part of analyzing the ways to improve the effectiveness and flexibility of the international community’s response to climate change requires looking at the overlap of the two issues and protocols. The links between them do not stop at the mere fact that they both address atmospheric threats. There are two main sources of conflict and overlaps that, if unaddressed, threaten the effectiveness of both—the regulation by the Kyoto Protocol of ozone-safe alternatives to CFCs and the increased production of greenhouse gases through the use and production of CFC alternatives by the Montreal Protocol.¹⁶⁰ The Montreal Protocol tends to promote the utilization of chemicals which happen to be greenhouse gases as the substitutes for ozone depleting substances, while the Kyoto Protocol conversely encourages the production of ozone depleting substances

¹⁵³ See BENEDICK, *supra* note 12, at 14 (noting how flexibility worked into the Montreal Protocol helped gain the support of governments for strong regulations).

¹⁵⁴ See Thoms, *supra* note 3, at 809–10 (describing the role and importance of the Montreal Protocol using a combination of targets and timetables as the method of regulating the principal ODSs).

¹⁵⁵ See BENEDICK, *supra* note 12, at 14 (noting the scientific debate around partial or complete coverage of ozone-destroying substances and ultimately concluding that complete coverage was necessary).

¹⁵⁶ See *id.* (noting how flexibility worked into the Montreal Protocol helped gain the support of governments for strong regulations).

¹⁵⁷ Kyoto Protocol, *supra* note 2, art. 5 (excluding those gases regulated by the Montreal Protocol).

¹⁵⁸ *Id.*

¹⁵⁹ *Id.* art. 2, para. 1(a)(ii), art. 5; see also McCabe, *supra* note 18, at 439–44 (describing the conflicting aspects of the Montreal and Kyoto protocols, and specifically pointing to various chemicals that play a major role in the conflicting policies of the two treaties).

¹⁶⁰ McCabe, *supra* note 18, at 439–44 (outlining the conflicts and overlaps between the Kyoto Protocol and the Montreal Protocol).

through its emissions credit system.¹⁶¹ This paradox needs to be addressed in order to maximize the effectiveness of each protocol.

Most of the chief alternatives to CFCs that are much safer for the ozone layer also contribute greatly to climate change.¹⁶² HFC-23, for example, “has one of the highest global warming potentials of any greenhouse gas regulated by the Kyoto Protocol.”¹⁶³ Cooperation between the climate change regime and the Montreal Protocol could lead to both taking into consideration the effects of various chemicals on both ozone depletion and climate change. This would be significant because the Montreal Protocol essentially needs to cease funding—through the Multilateral Fund—projects in the developing world that revolve around alternatives that are ozone safe, but dangerous greenhouse gases.¹⁶⁴ At the recent Meeting of the Parties of the Montreal Protocol, steps were taken to address this very overlap. With the Montreal Protocol having already achieved greater advances in climate protection than the Kyoto Protocol will achieve in its first commitment period, many estimate that the cumulative effects of the new measures will have a significant impact on climate change compared to the emission reduction targets of the Kyoto Protocol.¹⁶⁵ The new provisions will accelerate the phase-out of HCFCs by ten years.¹⁶⁶ These accelerated reductions will not only increase the rate of recovery of the ozone layer, but they will also have a significant positive effect on climate change.¹⁶⁷ This is in part due to the inclusion of the developing world. Since the reductions stem from ODSs and the Montreal Protocol, the developing countries face similar compliance requirements as developed country parties.¹⁶⁸ This is a crucial step in the process of linking the two regimes that should hopefully be a sign of further cooperation in the future.

¹⁶¹ *Id.* at 465 (stating how each protocol encourages further use of substances that are contributing to the problem addressed by the other protocol and of substances of which the other protocol attempts to diminish use and production).

¹⁶² *Id.* at 440 (noting that HFCs and HCFCs are encouraged as low ODP substitutes for CFCs by the Montreal Protocol, but are also greenhouse gases that contribute to climate change).

¹⁶³ *Id.* at 443 (using HFC-23 as an example of how the use of a substance is encouraged by the Montreal Protocol, but such increased usage is adverse to the objectives of the Kyoto Protocol because the substance has a high GWP).

¹⁶⁴ See DONALD KANIARU ET AL., FREQUENTLY ASKED QUESTIONS: STRENGTHENING THE MONTREAL PROTOCOL BY ACCELERATING THE PHASE-OUT OF HCFCs AT THE 20TH ANNIVERSARY MEETING OF THE PARTIES 9 (2007), available at <http://www.igsd.org/about/publications/FAQFinal16July.pdf>.

¹⁶⁵ Guus J. M. Velders et al., *The Importance of the Montreal Protocol in Protecting Climate*, 104 PROC. NAT'L ACAD. OF SCI. OF THE U.S. 4814, 4818 (2007), available at <http://www.pnas.org/content/104/12/4814.full.pdf> (discussing the ways that the Montreal Protocol can be used to discourage the use of substances with a high GWP so that significant reductions in greenhouse gas emissions can be achieved through implementation of the Montreal Protocol as well as the Kyoto Protocol).

¹⁶⁶ Press Release, UNEP, Combating Climate Change Given Big Confidence Boost in Canada: Governments Agree to Accelerated “Freeze and Phase-out” of Ozone and Climate-Damaging Chemicals at Montreal Protocol’s 20th Anniversary Celebrations (Sept. 22, 2007), available at <http://ozone.unep.org/Publications/PressReleaseFinal-22Sept2007.pdf> [hereinafter Combating].

¹⁶⁷ *Id.* (quoting Achim Steiner, U.N. Under-Secretary General and U.N. Environmental Program Executive Director, as having stated, “[t]he precise and final savings in terms of greenhouse gas emissions could amount to several billions of [metric tons]”).

¹⁶⁸ See *id.* (discussing how the agreements apply to developing countries and the Multilateral Fund).

Additionally, the next global climate change regime needs to give full credit for and take into account the use of carbon sinks. Carbon sinks have considerable positive effects on the overall carbon and greenhouse gas situation, so they should be fully taken into account.¹⁶⁹ Limiting the amount that a country may use carbon sink creation to aid its compliance with emissions reductions diminishes the incentive for countries to adopt widespread carbon sink creation projects such as reforestation. Raising or even eliminating the limit would add more flexibility to the protocol and would substantially increase the incentive for states to engage in and fund carbon sink creation activities, which are certainly positive activities for the environment.¹⁷⁰ This would be a significant addition to the next international framework and approach to climate change, because it would give states a viable option to take proactive measures to reduce their net greenhouse gas emissions and would therefore provide more incentive to undertake such projects.¹⁷¹ Options for reducing emissions serve to substantially increase the flexibility of an international agreement and thereby put in place protections of state sovereignty.

The exclusion of both substances regulated by the Montreal Protocol and the use of carbon sinks limits the flexibility of the parties to the Kyoto Protocol. While the exclusions might be logical, they bring up issues of equity.¹⁷² A more proper basket approach would take into account *all* sources that affect the basket's net allowance. Limiting the use of carbon sinks when it is a feasible and practical activity to reduce net emissions in many countries, calls into question the fairness of the Kyoto Protocol itself. By following the model of the Montreal Protocol and allowing more flexibility, the world's approach to climate change would be more equitable, less risky economically, and could better preserve states' sovereignty, thereby increasing participation in the treaty by facilitating compliance.

¹⁶⁹ See *supra* notes 122, 124.

¹⁷⁰ See Ohshita, *supra* note 122, at 22 (discussing the importance of carbon sequestration for mitigating climate change).

¹⁷¹ Accounting for the effects of deforestation and destruction of vast carbon sinks would help protect such areas from the type of land-use changes that affect not just the climate and the planet's ability to absorb carbon dioxide, but also precious ecosystems and biodiversity. See *supra* notes 122, 124.

¹⁷² Many argue against counting the carbon dioxide removed via carbon sinks towards a country's emissions reductions. See, e.g., Bruce Yandle & Stuart Buck, *Bootleggers, Baptists, and the Global Warming Battle*, 26 HARV. ENVTL. L. REV. 177, 221 (2002) (noting that the European Union was against counting or crediting a mere 20% of the United States's requirements to carbon dioxide absorbed by U.S. forests). The existence of natural carbon sinks varies significantly from one country to the next. Many view giving credit for reductions by carbon sinks to some as inequitable, because the size and geographical location largely determines the existence of carbon sinks. See *id.* at 221–22 (citing an article that appeared in *Science* magazine/journal that estimated that the forests of the United States and Canada absorbed enough carbon dioxide from the atmosphere to balance all of their carbon emissions). At the same time, however, countries that are investing in the protection and creation of carbon sinks (whether in their own countries or others) should be able to receive credit for such positive activities. See *id.* at 222 (noting that the United States has had success with its reforestation and carbon sink creation activities, and that it seems part of opposition to permitting the United States to receive credit for such activities arises out of envy, as opposed to disagreement with the activities themselves). These activities should be promoted and encouraged through proper incentives.

B. Common but Differentiated Responsibilities

Perhaps the most substantial improvements to the global approach to climate change could come from adopting an interpretation of the common but differentiated responsibilities principle that is more in line with the approach taken by the Montreal Protocol that has proved so successful and innovative.¹⁷³ The problems can be traced to misinterpretation of the precedent set by the Montreal Protocol.¹⁷⁴ While the Montreal Protocol treated developing countries differently, it did not go so far as to exclude them from participating in the reductions and eventual phase-outs of ODSs.¹⁷⁵

The creation of the Multilateral Fund for the Montreal Protocol was done with great hesitation by the developed countries for fear of the precedent it would set.¹⁷⁶ In the end, however, the countries put those concerns aside and adopted the mechanism. That decision seems to have come back to haunt them because, with the developing countries excluded from the Kyoto Protocol's mandatory obligations, it seems the precedent has been misinterpreted. It incorrectly became common but *exclusive* responsibilities instead of the true actual precedent of countries having common but differentiated responsibilities. While developing countries need and deserve to have differing obligations and responsibilities than developed countries, the Kyoto Protocol improperly excludes them to the detriment of the overall goal of combating climate change.¹⁷⁷

There are many reasons developing countries deserve different treatment under international treaties addressing global environmental problems.¹⁷⁸ The Kyoto Protocol, however, seems to have gone too far with the different responsibilities and lost track of the first part of the principle—*common responsibilities*. The principle should not be interpreted as referring to a common concern that requires differing responsibilities. The exclusion of some states is an

¹⁷³ See *supra* notes 86–94 and accompanying text.

¹⁷⁴ The principle of common but differentiated responsibilities was exemplified in the Montreal Protocol when the developed states agreed to provide developing countries with a grace period, transfer technology, and create the Multilateral Fund to assist compliance. These positive actions and representations of the principle were mistakenly interpreted to mean that while the problem itself may be common, the responsibility falls on the developed states. See Harris, *supra* note 146, at 31–36. This is the application of the common but differentiated responsibilities that was applied in the Kyoto Protocol. See *id.* However, that interpretation is wrong; the actions of the parties to the Montreal Protocol should be interpreted as meaning that the developed countries may take the lead and assist developing countries, but responsibility for common concerns necessitates the undertaking of a common responsibility by all nations. See *id.* at 48 (arguing for the participation of developing countries).

¹⁷⁵ See Montreal Protocol, *supra* note 1, arts. 5, 10, para. 3; BENEDICK, *supra* note 12, at 15 (noting that the developing countries were given a 10-year grace period before they had to meet obligations under the Montreal Protocol).

¹⁷⁶ DeSombre, *supra* note 39, at 73 (discussing the precedent of the Montreal Protocol's creation of the Multilateral Fund and its effect on subsequent global environmental negotiations).

¹⁷⁷ See Baumert, *supra* note 100, at 366 (stating that “it is simply not possible to protect the climate system over the long term if developing countries do not participate in emission reductions”).

¹⁷⁸ See Stone, *supra* note 34, at 290 (noting that the Rio Declaration supports the contention that there are at least three general reasons developing countries deserve differentiated treatment under the principle: the needs of a country, its contributions to the problem, and its capabilities to address the problem).

equitable imbalance that threatens the effectiveness of the entire mission.¹⁷⁹ Thus, the inaccurate interpretation and application of the precedent established by the Montreal Protocol must be reversed to effectively implement the principal of common but differentiated responsibilities in the climate change context.

The active inclusion of developing countries in the process of addressing climate change or other global environmental problems will have many benefits. Not the least of which is the potential and likely impact on industry and technology. The Montreal Protocol forced technology to catch up and greatly accelerated research and development of ozone safe technological replacements.¹⁸⁰ The financial and intellectual resources and capacity of private enterprise make industry cooperation and participation essential to effective regulation of ODSs and reversal of ozone depletion.¹⁸¹

As the world continues to address the issue of climate change, technology will play an important role in any approach managing the problem.¹⁸² Many scientists have said that the development of new technologies could be the only means to fight climate change.¹⁸³ Regardless of whether these scientists are correct and technology is the only answer, it *will* play a vital role in adapting to *or* correcting and reversing climate change.¹⁸⁴ Incentives for the development of new technology must be part of any global action addressing climate change. Including developing countries in the regulatory regime diminishes the incentives for industries to move their companies abroad to avoid the regulations.¹⁸⁵ Instead, the certainty of the declining market lets the private industrial sector know that investment in emerging technologies and new markets will be financially beneficial in the long run.¹⁸⁶

Another important reason to include developing countries' participation in any regulatory control measures is that the rate of population growth in much of the developing world is huge.¹⁸⁷ Historically, the developing countries did not necessarily cause the problems, or at the very least contributed minimally, but their growth rates and continued development along environmentally unfriendly lines will eventually begin to significantly work against the long-term goals of the Kyoto

¹⁷⁹ See Weisslitz, *supra* note 72, at 477 (noting that without mandatory emission freezes or reductions for developing countries, they will continue expanding their use of greenhouse gases, which in turn could cause irrevocable damage to the environment).

¹⁸⁰ See DeSombre, *supra* note 39, at 59–62 (discussing the ways that the Montreal Protocol was a technology forcing agreement).

¹⁸¹ See BENEDICK, *supra* note 12, at 22 (highlighting the role of both nongovernmental organizations and industry in global responses to environmental threats, particularly pointing to the importance of industry because “society ultimately depends on industry to provide the technological solutions”).

¹⁸² See Abdel-khalik, *supra* note 101, at 506 (asserting that most scientists believe that “technology will be the only way to combat global warming” and that “[t]he key to reducing carbon dioxide emissions will be technology”).

¹⁸³ See *id.* (explaining the important role that the development of new technology has in combating climate change).

¹⁸⁴ See *id.*

¹⁸⁵ See *supra* notes 91–92 and accompanying text.

¹⁸⁶ See BENEDICK, *supra* note 12, at 22 (noting that when it is profitable to invest in new technologies, the market will have investors and develop the necessary technology).

¹⁸⁷ See *id.*

Protocol.¹⁸⁸ The Montreal Protocol faced this same issue, but avoided the same inequitable results by granting developing countries a ten-year grace period.¹⁸⁹ The ozone depletion footprint of developing countries increased during their ten-year grace period, but now, as required, they face the same obligatory reductions and phase-outs that developed countries have faced since the Montreal Protocol entered into force.¹⁹⁰ This same pattern is repeating itself with climate change and the Kyoto Protocol. Through their increasing growth and industrialization, developing countries' carbon footprints and contributions to global warming are left unchecked by their exclusion from the regulatory reductions, thereby exposing the environment to enormous future environmental damage.¹⁹¹

For example, China is on pace to emit forty percent of the world's greenhouse gas emissions by as soon as 2025.¹⁹² As a developing nation, China is not subject to *any* binding obligations under the Kyoto Protocol.¹⁹³ Such exclusion of China is analogous to intentionally excluding the United States (long the world's largest emitter of greenhouse gases) from obligations.¹⁹⁴ It just does not make sense and undermines the object and purpose of the entire agreement.¹⁹⁵ By not placing binding obligations on China and other developing nations, this is effectively (though not intentionally) what has happened—the equivalent of nonparticipation by the United States.¹⁹⁶ Some estimates already claim China has surpassed the United States as the world's largest emitter of greenhouse gases.¹⁹⁷ The exclusion of the top emitter of greenhouse gases is inexcusable and significantly detracts from the legitimacy of the global response.

To a certain extent, the inequity of the historical contributions is irrelevant because currently developing country greenhouse gas emission levels continue to

¹⁸⁸ See Weisslitz, *supra* note 72, at 490 (asserting that since developing nations account for about four-fifths of the world's population, have extensive land masses, and have yet to industrialize most of the land, they are more likely to cause substantial harm to the environment). Between 1990 and 2020, developing nations are predicted to account for more than 75% of the global carbon emissions increase. *Id.*

¹⁸⁹ Montreal Protocol, *supra* note 1, arts. 5, 10, para. 3.

¹⁹⁰ See DeSombre, *supra* note 39, at 69–70 (discussing estimates of increasing use of ODSs by developing countries after adoption of the Montreal Protocol and recognition by the parties that this would likely occur during the 10-year grace period).

¹⁹¹ See Nina E. Bafundo, Comment, *Compliance with the Ozone Treaty: Weak States and the Principle of Common but Differentiated Responsibility*, 21 AM. U. INT'L L. REV. 461, 467 (2006) (discussing the goals of the principle of common but differentiated responsibility and the important role that developing nations play in effectively responding to environmental challenges).

¹⁹² See Childs, *supra* note 98, at 252 (examining effects of sustainable development and the role of developing nations in the Kyoto Protocol, particularly looking at the situation of China).

¹⁹³ See Kyoto Protocol, *supra* note 2, art. 3; Ohshita, *supra* note 122, at 19.

¹⁹⁴ At the time of the Kyoto Protocol's development, the United States was the world's largest emitter, accounting for about 20% of global greenhouse gas emissions. See Sunstein, *supra* note 4, at 50 (describing the role of various countries in climate change and charting the top emitters of 2000).

¹⁹⁵ The object and purpose of the Kyoto Protocol is the same as that of the Climate Change Convention, which is to stabilize "greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Climate Change Convention, *supra* note 106, art. 2; Kyoto Protocol, *supra* note 2, pmb1.

¹⁹⁶ See Ohshita, *supra* note 122, at 30 (noting that the United States and China bear "the largest share of the problem").

¹⁹⁷ See *id.* (discussing and comparing the current role of China in terms of greenhouse gas emissions with various other countries, such as the United States).

increase and are predicted to possibly surpass those of the developed world by 2020, if left unrestricted.¹⁹⁸ Clearly there is an issue of the developing world's right to develop and their willingness to jeopardize that development.¹⁹⁹ But this should not mean they are entirely excluded from taking any part in the cooperative measures to address climate change, because they are "quickly becoming primary emitters of greenhouse gases."²⁰⁰ Additionally, their participation in binding commitments would ultimately lead to increased energy efficiency, which could serve to benefit the development of their economies and standards of living.

Another key part of the principle is the word "responsibilities." This should include the responsible development of the South. Obviously that is a vague concept, but if the developing countries subject themselves even to broad control measures and standards, that is better than leaving them excluded and their growth unchecked. The approach taken by the Kyoto Protocol to the principle of common but differentiated responsibilities focuses too heavily on economic and social concerns to the detriment of the treaty's object and purpose of addressing an environmental concern.²⁰¹ If developed countries have the assurance that their financial and technological contributions will be spent in such a way as to bring the developing countries into compliance with the same commitments they themselves are obligated to meet, then they will be more willing to contribute to such a fund.²⁰²

The argument that the North developed without similar responsibilities certainly has some merit, but in reality, the South is able to develop with much better technology than the North, regardless of regulatory obligations.²⁰³ Furthermore, without binding obligations and commitments encouraging them to

¹⁹⁸ See Weiszlitz, *supra* note 72, at 490. Weiszlitz discusses the evidence indicating that, as developing states continue their growth, they are quickly catching up to developed states in terms of greenhouse gas emissions and are likely to pass them by 2020. *Id.* Weiszlitz's analysis goes on to point out additional reasons for including developing nations in obligations under the climate change regime, significantly noting that developing nations are more susceptible to the dangers posed by climate change. *Id.* This is a result of not just their limited economic ability to cope with climate changes, but also of human health and ecological systems repercussions. *Id.*

¹⁹⁹ The right to develop is perhaps best defined by the 1986 Declaration on the Right to Development, which says it is "an inalienable human right by virtue of which every human person and all peoples are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and fundamental freedoms can be fully realized." 1986 Declaration, *supra* note 74, art. 1, para. 1. The Preamble of the 1986 Declaration defines development as "a comprehensive economic, social, cultural and political process which aims at the constant improvement of the well-being of the entire population and of all individuals on the basis of their actions, free and meaningful participation in development and in the fair distribution of benefits resulting therefrom." *Id.* pmbl.

²⁰⁰ Childs, *supra* note 98, at 251.

²⁰¹ See Weiszlitz, *supra* note 72, at 489 (discussing how too much focus on economic concerns by developing states has worked to their disadvantage as well as to the disadvantage of the Kyoto Protocol's goals of addressing climate change, because environmental and economic concerns are actually intertwined).

²⁰² *Id.* at 502 (describing how the exclusion of developing countries from any greenhouse gas reduction obligations under the Kyoto Protocol serves only to reduce the incentive for developed countries to engage in technology transfer and financing, because they are not assured that the funds will either advance the object and purpose of the treaty by reducing greenhouse gas emissions or used by the developing countries to make greenhouse gas emission cuts at all).

²⁰³ See Halvorsen, *supra* note 98, at 253-54 (noting developing countries are developing with cleaner technology available to them).

use more advanced energy efficient technology, their development will rely on technology and energy sources that contribute to climate change.²⁰⁴ Instead of getting ahead of the problem, exclusion of the developing countries will result in a cyclical pattern of greenhouse gas emissions.²⁰⁵ It will not take long for the reductions by the North to be replaced by the emissions of the South, which are increasing exponentially.²⁰⁶ Returning to the China example, China continues to increase its use of coal power plants that are on average six times *less* efficient than coal plants in the United States.²⁰⁷ With the Kyoto Protocol not forcing developing nations such as China to share in the responsibility of the health of the environment, they will continue to develop without any incentive or obligation to advance the goals of the protocol through the use of more expensive yet much more efficient technology systems. The “responsibilities” referred to in the common but differentiated responsibilities principle are common to everyone, not just the developed world.

Any international action to address climate change that excludes the developing countries from meeting their own differentiated obligations will likely be missing the participation of the United States.²⁰⁸ In order to benefit from the necessary participation of the United States, a revised policy must be crafted so that all countries, developed and developing, not only share the responsibility to address climate change, but also share in the response. Such an amended course of action could significantly decrease reluctance to join the international effort to stall climate change, and could create more equitable economic impacts by minimizing the competitive advantage that many developing countries gain through their current exclusion. The principle must be applied as common (responsibilities) but differentiated responsibilities and *not* common (concern) but exclusive responsibilities.

V. CONCLUSION

The issues of ozone depletion and climate change have their similarities and differences. In many ways, climate change is *similar* to ozone depletion, but on a much grander scale. The use of ODSs was confined to a relatively small amount of products, whereas greenhouse gas emissions arise from nearly all areas of life. As a

²⁰⁴ See Weisslitz, *supra* note 72, at 478; Harris, *supra* note 146, at 42–43 (citing President Bill Clinton speaking about the opportunity facing developing countries to develop with better technology and therefore without as damaging environmental effects).

²⁰⁵ See Baumert, *supra* note 100, at 366 (noting the importance of the participation of developing countries to climate protection).

²⁰⁶ See Weisslitz, *supra* note 72, at 490 (discussing the speed with which greenhouse gas emissions by developing states are increasing relative to the emissions of the developed states).

²⁰⁷ See Childs, *supra* note 98, at 252.

²⁰⁸ The United States Senate voted 95–0 to pass the Byrd-Hagel Resolution which conditions ratification by the Senate of any protocol/treaty regulating greenhouse gas emissions on the substantial involvement and inclusion of commitments for developing countries. See Steve Charnovitz, *Using Framework Statutes to Facilitate U.S. Treaty Making*, 98 AM. J. INT’L. L. 696, 704 (2004); see also, e.g., Thoms, *supra* note 3, at 833; Halvorsen, *supra* note 98, at 250 (noting that the United States continues to argue that it should not be subject to binding commitments, because the “fast-growing developing countries” are not subject to any); Harris, *supra* note 146, at 42 (quoting President Bill Clinton as stating that “both industrialized and developing countries must participate in meeting the challenge of climate change”).

result, any approach to climate change has vastly more significant economic implications than the world dealt with combating ozone depletion. Such differences might mean that the details of the Montreal Protocol are inapplicable to climate change. However, the general interpretation and use of international environmental legal principles is still very much relevant, and there is much to learn from the Montreal Protocol for addressing climate change.

The international approach to climate change can have a similar level of success as the approach to ozone depletion by simply understanding some of the important lessons learned from the experience of creating and implementing the Montreal Protocol. Refining the mechanisms of the Kyoto Protocol to increase the flexibility of the next stage of the global response to climate change would have a substantial impact on the willingness of states to surrender some sovereignty for the common good. They need to have available as much latitude in the implementation of the climate change regime as possible. This means, among other things, getting full credit for carbon sink creation, getting credit for reduction of greenhouse gases that are regulated by the Montreal Protocol, and creating incentives to increase industry participation and investment. Additionally, a more proper interpretation and application of the principle of common but differentiated responsibilities could turn the tide in the effort to control climate change. The issue is one of common concern, but states must also all accept the common responsibilities they each have towards both resolving the threat and refraining from exacerbating the threat. Following the Montreal Protocol's lead on these two principles could get the international response to climate change back on track with an equitable and effective strategy.