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TO REDUCE ENERGY CONSUMPTION

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I. INTRODUCTION

This Article argues that developed countries have an ethical responsibility to reduce energy consumption—through energy efficiency and conservation—as part of the global effort to reduce greenhouse gas emissions. While this responsibility is borne by nations themselves, it has consequences for the individuals living in those nations. This Article also argues that developing countries have different duties concerning energy consumption. Their responsibility to improve human quality of life will mean greater use of modern energy, especially when it is not now available. At the same time, developing countries should use energy efficiency and conservation when it is cost effective to do so.

The human impact on the environment has often been expressed as a product of population, per capita consumption, and technology. In mathematical terms, the equation may be represented as follows: I (impact) = P (population) x A (affluence, or per capita consumption) x T (technology).¹ The core message of this equation is that three factors contribute to our environmental impact—population, consumption, and technology—and that no effort to reduce that impact is likely to succeed unless all three—including consumption—are addressed.

This message has particular relevance to climate change. The United Nations now estimates that global population, now more than six

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1. Amit Kapur & Thomas E. Graedel, *Production and Consumption of Materials*, in *STUMBLING TOWARD SUSTAINABILITY* 63, 67 (John C. Dernbach ed., 2002).

billion, will peak sometime after 2050 at between nine and ten billion and decline slowly thereafter.² While climate change is harder to address with a larger population than a smaller population, and the challenge of feeding, clothing, housing, and employing this many people is enormous, it is at least plausible to envision the end of global population growth. There is also a rich and abundant literature on the role that technology needs to play in reducing greenhouse gas emissions.³ The growing consumption of energy, on the other hand, has all too often been unquestioned, especially in the United States and other developed countries, although there are signs that things are changing. In December 2008, the European Parliament approved legislation to reduce greenhouse gas emissions by 20% from 1990 levels by 2020,⁴ to increase renewable energy usage by 20%,⁵ and to cut energy consumption through improved energy efficiency by 20%.⁶ Even in the United States, unstable energy prices and the current recession have created an environment where it is possible to discuss reduced energy consumption.⁷

The ethical dimensions of climate change are also becoming more prominent. The goal of the United Nations Framework Convention on Climate Change (the “Convention”) is “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.”⁸ While there is a growing recognition that a global solution to climate change is necessary to assure that atmospheric concentrations of greenhouse gases do not exceed dangerous levels, nations will need to limit their emissions based upon equity rather than national interest alone to assure that global atmospheric goals are achieved. In fact, climate change raises many

2. U.N. Dep’t of Econ. & Soc. Affairs, *World Population to 2300*, at 4, 12, U.N. Doc. ST/ESA/SER.A/236 (2004), available at <http://www.un.org/esa/population/publications/longrange2/WorldPop2300final.pdf>.

3. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: MITIGATION 36 (Bert Metz et al. eds., 2007) [hereinafter IPCC: MITIGATION].

4. Decision 406/2009/EC, 2009 O.J. (L 140) 137.

5. Council Directive 2009/28/EC, 2009 O.J. (L 140) 17.

6. Council Directive 2009/28/EC, 2009 O.J. (L 140) 18.

7. See John Dernbach & Widener Univ. Law Sch. Seminar on Energy Efficiency, *Stabilizing and Then Reducing U.S. Energy Consumption: Legal and Policy Tools for Efficiency and Conservation*, 37 ENVTL. L. REP. 10,003, 10,006-11 (2007) [hereinafter Dernbach & Widener Univ.].

8. United Nations Framework Convention on Climate Change art. 2, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter Framework Convention].

civilization-challenging ethical issues.⁹ Climate change must be understood as creating these ethical challenges because: (1) those who are most responsible for climate change are often separated by great time and space from those who are most vulnerable to climate change impacts; (2) the harms to some may be catastrophic; and (3) achievement of a global solution will require consideration of the interests of others.

The ethical issues associated with energy consumption have received less attention. The two principle ways of reducing energy consumption are energy efficiency and energy conservation.¹⁰ Energy efficiency involves doing the same amount of work or producing the same amount of goods or services with less energy.¹¹ Energy conservation involves using less energy regardless of whether energy efficiency has changed.¹² The other major options available to address climate change are direct reduction of greenhouse gas emissions, long-term storage of carbon, and adaptation.¹³ Energy efficiency and conservation differ from other mitigation options, such as renewable energy and carbon sequestration, because they offer an opportunity for payback of the initial investment through cost savings.¹⁴ They also reduce the demand for fossil fuels, the fastest growing source of greenhouse gas emissions, and can be implemented right away.¹⁵

This Article argues that energy efficiency and conservation are not simply two more options that countries can employ to address climate change; they are entitled to particular ethical consideration. While there are strong ethical arguments that developed countries should reduce their greenhouse gas emissions, the argument for reducing energy consumption is even more compelling. As the Intergovernmental Panel on Climate Change (“IPCC”) points out, there is an obvious need for

9. See generally DONALD BROWN ET AL., ROCK ETHICS INST., WHITE PAPER ON THE ETHICAL DIMENSIONS OF CLIMATE CHANGE (2007), available at <http://www.webethics.net/padova2008/doc/pdf/edcc-whitepaper.pdf> (describing various ethical issues associated with climate change).

10. See NAT’L ENERGY POLICY DEV. GROUP, NATIONAL ENERGY POLICY 1-3 (2001), available at <http://www.wtrg.com/EnergyReport/National-Energy-Policy.pdf>.

11. *Id.*

12. *Id.*

13. See INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2007: IMPACTS, ADAPTATION AND VULNERABILITY 748 (Martin Parry et al. eds., 2007); IPCC: MITIGATION, *supra* note 3, at 188-89, 210.

14. See Dernbach & Widener Univ., *supra* note 7, at 10,003.

15. See *id.*; IPCC: MITIGATION, *supra* note 3, at 103, 265.

“immediate short-term action.”¹⁶ Similarly, an international assessment of the ethical dimensions of climate change concluded that “various ethical systems converge in the conclusion that atmospheric levels of [greenhouse gases] should be stabilized at the lowest possible levels above existing atmospheric [greenhouse gas] concentrations.”¹⁷

This Article advances two independent but related lines of analysis. Part II shows that basic principles stated in the Convention lead logically to the conclusion that developed countries need to reduce their energy consumption. Part III reaches the same result through the use of traditional ethical principles. To be clear, we are not arguing here for a particular level of energy efficiency or conservation by developed countries. Nor are we arguing that developing countries have no ethical responsibilities concerning energy consumption. Our point is simply that energy consumption has a distinct and critical ethical dimension—particularly for developed countries and the individuals who live and work in them.

Ethics is “the domain of inquiry that explores what is right or wrong, obligatory or non-obligatory, or when responsibility attaches to human behavior.”¹⁸ Putting this issue into an ethical context adds value to the climate change debate for several reasons. First, and most prominently, it makes clear that efforts to address climate change are not to be guided only by perceived national or personal self-interest, but also by responsibilities to others. Second, no national effort to address climate change is likely to succeed without the active involvement and engagement of its citizens. Personal ethical norms, in other words, will play a substantial role in the success or failure of this effort. Third, some climate change policy options concerning energy demand may be ethically problematic.

II. PRINCIPLES IN THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Convention articulates three basic principles that, particularly for developed countries, emphasize the importance of reducing energy consumption.¹⁹ While these principles do not dictate a particular level of effort, they do suggest that developed countries should employ energy

16. IPCC: MITIGATION, *supra* note 3, at 47.

17. BROWN ET AL., *supra* note 9, at 18 (citation omitted).

18. Donald A. Brown, *Why Global Environmental Problems Entail Ethical Obligations*, MEA BULLETIN (U.N. Environment Programme, Nairobi, Kenya), Apr. 9, 2009, at 1, available at <http://www.iisd.ca/mea-1/guestarticle67.html>.

19. Framework Convention, *supra* note 8, art. 3.

efficiency and conservation. To the extent it is cost effective, developed countries should help foster replicable models of the good life that are based on much lower energy consumption levels, help foster sustainable development, and reduce adverse impacts on developing countries.²⁰

A. Duties of Developed Countries

Three normative principles recognized by international law create a preference for energy efficiency and conservation. These are (1) developed country leadership, (2) equity for developing and vulnerable countries, and (3) the right to promote sustainable development.²¹

These principles are stated in the Convention.²² These are not, in other words, principles that are important only to developed or developing countries, to a particular religious or ethical perspective, or to a specialized academic movement independent of the Convention itself. They were agreed to by parties to the Convention and provide the basic approach that nations use under the Convention in annual conferences and decision-making.²³ It is therefore appropriate and even necessary for nations, especially developed nations, to use these principles in their analysis of the options available for climate change mitigation.

1. Developed Country Leadership.

Developed country²⁴ leadership in the Convention is premised in part on the fact that “the largest share of historical and current global emissions of greenhouse gases has originated in developed countries.”²⁵ It is also premised on the greater technological ability and financial resources of developed countries.²⁶ Put simply, developed countries have contributed the most to the problem of climate change and have the greatest ability—both economically and politically—to address it. They thus have an ethical responsibility under the Convention to take a leadership role.

20. *See id.* arts. 3-4.

21. *Id.* art. 3.

22. *Id.*

23. *Id.* art. 7.

24. As used in this Article, the term “developed countries” refers primarily to those countries listed in Annex II of the Convention—these countries that are not considered to be in transition to a market economy. *See Framework Convention, supra* note 8, Annex II.

25. Framework Convention, *supra* note 8, pmbl.

26. *Id.* arts. 4.3, 4.5, 4.7.

Developed country leadership is expressed as a decision-making principle in Article 3, which sets out several principles that the parties are to consider.²⁷ It is also expressed as a legal duty in Article 4.2, which sets out the specific responsibilities of developed countries.²⁸ According to Article 4.2, each developed country party:

[S]hall adopt national policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs. These policies and measures will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions²⁹

Developed country leadership creates a preference for energy conservation and efficiency as a means of reducing carbon dioxide emissions for several reasons. First, efficiency and conservation provide a set of options that can be implemented right away. In the short-term (2000 to 2030), energy efficiency and conservation can deliver more cumulative emissions reductions than other carbon dioxide mitigation options.³⁰ A major effort on behalf of efficiency and conservation within the boundaries of developed countries would likely significantly reduce their greenhouse gas emissions. Efficiency and conservation provide one of the best short-term means for developed countries to demonstrate their leadership in reducing greenhouse gas emissions.³¹

Energy efficiency and conservation also address the largest and fastest growing source of greenhouse gas emissions. Carbon dioxide from fossil fuel use represented 56.6% of anthropogenic greenhouse gas emissions in 2004.³² Carbon dioxide from fossil fuel is also the fastest growing source of greenhouse gas emissions, having grown by about 80% between 1970 and 2004.³³ While this growth is particularly pronounced in Asia, carbon dioxide emissions from fossil fuels continue to rise in some developed countries as well.³⁴ Carbon dioxide emissions from fossil fuels were relatively stable between 1971 and 2004 in Western Europe (at about four gigatons of carbon dioxide annually),

27. *Id.* art. 3.1 (“[T]he developed country Parties should take the lead in combating climate change and the adverse effects thereof.”).

28. *Id.* art. 4.2.

29. *Id.* art. 4.2(a) (footnote omitted).

30. IPCC: MITIGATION, *supra* note 3, at 203 fig.3.23.

31. Other options with significant short-term potential to mitigate climate change include short-term reduction of two particular pollutants—methane and black carbon. *See id.* at 206-07.

32. *Id.* at 28 fig.TS.1b.

33. *Id.* at 28 fig.TS.1a.

34. *Id.* at 262 tbl.4.1.

grew in North America (from almost five gigatons of carbon dioxide to nearly seven gigatons), and grew very rapidly in Asia (from about one to about seven gigatons).³⁵ Because energy efficiency and conservation can significantly reduce the demand for fossil fuels in the short-term (and the long-term), they provide a way of arresting the growth of carbon dioxide emissions from fossil fuels. Unified leadership by developed countries on this point would be of no small value in reducing emissions.

Finally, efficiency and conservation may provide the most immediate means for developed countries to reduce their per capita greenhouse gas emissions. Developed countries have much higher levels of per capita greenhouse emissions.³⁶ Developed countries, with 20% of the world's population, are responsible for 46% of the greenhouse gas emissions.³⁷ Developing countries, with the remaining 80% of the world's population, contribute 54% of the greenhouse gas emissions.³⁸ At the same time, the greenhouse gas intensity of developed countries—greenhouse gas emissions per dollar of the gross domestic product (“GDP”)—is much lower than in developing countries.³⁹ With 57% of the gross world product, developed countries have a greenhouse gas intensity of 0.68 kilograms of carbon dioxide equivalent per U.S. dollar in GDP.⁴⁰ Developing countries, with 43% of the gross world product, have a greenhouse gas intensity of 1.06 kilograms of carbon dioxide equivalent per U.S. dollar of GDP.⁴¹ Despite their low per capita greenhouse gas emissions, the greenhouse gas intensity of developing countries is nearly double that of developed countries.⁴²

Developed country leadership would mean reductions in per capita greenhouse gas emissions in developed countries. Developed country leadership would also mean assisting developing countries in significantly improving their greenhouse gas intensity. Efficiency and conservation, again, provide the most immediate means of achieving those results. Developed country leadership, coupled with technical and economic resources otherwise unavailable to developing countries, should also help reduce greenhouse gas intensity in developing countries.

35. *Id.* at 261 fig.4.6.

36. *See id.* at 30.

37. *Id.*

38. *Id.*

39. *See id.*

40. *Id.*

41. *Id.*

42. *See id.*

2. Equity for Developing and Vulnerable Countries.

In some ways, equity for developing and vulnerable countries is the other side of the developed country leadership coin. Developing countries have done the least to contribute to historic and current greenhouse gas emissions.⁴³ They tend to have the fewest financial and technological resources.⁴⁴ Developing countries have the least responsibility for the problem and the least ability to reduce their own emissions.

But there is another and equally fundamental dimension to the equity principle: developing countries are most vulnerable to the adverse effects of climate change because they have the least financial and technological ability to successfully adapt. For some developing countries, there is also a topographic dimension; small and low lying island nations (all of which are developing countries) have no ability to prevent serious adverse effects of sea level rise from climate change.⁴⁵ Thus, the least responsible countries are also the ones that are likely to experience the most negative impacts of climate change.

Consequently, Article 3 states another decision-making principle: “The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.”⁴⁶

Equity for developing and vulnerable countries would counsel for stabilizing and reducing atmospheric greenhouse gas levels as soon as possible. That would, after all, reduce or avoid negative impacts to the most vulnerable (for example, Inuit peoples, Africa, and small island states). Because efficiency and conservation provide the best means for reducing emissions in the short-term, they provide the greatest

43. See Framework Convention, *supra* note 8, pmbl.

44. GLOBAL HUMANITARIAN FORUM, HUMAN IMPACT REPORT: CLIMATE CHANGE, THE ANATOMY OF A SILENT CRISIS 58 (2009), available at http://www.ghf-geneva.org/Portals/0/pdfs/human_impact_report.pdf. Some developing countries, of course, have both greater resources and emissions than others. These would include Brazil, China, and India. *Id.* at 64.

45. Among the countries identified most publicly with this issue is Tuvalu, which plans to be carbon neutral by 2020. Tuvalu’s highest point is only fifteen feet above sea level. See Bonnie Malkin, *Tuvalu Plots World’s First Zero Carbon Output by 2020*, DAILY TELEGRAPH, July 20, 2009, <http://www.telegraph.co.uk/news/worldnews/australiaandthepacific/tuvalu/5871093/Tuvalu-plots-worlds-first-zero-carbon-output-by-2020.html>. Even if Tuvalu manages to reduce its small level of greenhouse gas emissions to zero, that reduction will have virtually no effect on the rising sea level that threatens its existence. See *id.*

46. Framework Convention, *supra* note 8, art. 3.2.

opportunities to foster the principle of equity to developing and vulnerable countries.

3. Right to Promote Sustainable Development.

Sustainable development is a framework for fostering and improving human quality of life and well-being by integrating economic development, human rights, peace and security, and environmental protection. It applies not only to the current generation; it applies to future generations as well. Sustainable development is the officially recognized international approach for maintaining and improving the human condition.⁴⁷ The Convention states: “The Parties have a right to, and should, promote sustainable development.”⁴⁸ This right is stated not as an individual human right, but as a right that is held by states—both developed and developing.⁴⁹ While it is stated as a right to *promote* sustainable development, and not to sustainable development itself, the text plainly recognizes the right of states to work for and achieve sustainability.⁵⁰

In this light, efficiency and conservation are the most economically attractive of the four basic options to address climate change, and thus the options most consistent with sustainable development. Of the four basic options—direct control of greenhouse gas emissions, long-term storage of carbon, adaption to climate, and energy efficiency and conservation—only energy efficiency and conservation offers the prospect of cost savings.⁵¹ The other three options all involve additional costs, at least where modern energy is not already present.⁵²

In addition to economic benefits and greenhouse gas mitigation, efficiency and conservation can bring other benefits as well. These co-benefits include reduced demand pressure on energy prices, strengthened local and national economies, improved bottom lines for business, creation of more opportunities for job creation and technology development, protection of the poor and those on fixed incomes, reductions in other air pollutants (for example, sulfur dioxide and particulates), and better protection of public health.⁵³ All of these, in turn, foster sustainable development. It is true that renewable energy also

47. John C. Dernbach, *Sustainable Development as a Framework for National Governance*, 49 CASE W. RES. L. REV. 1, 100 (1998).

48. Framework Convention, *supra* note 8, art. 3.4.

49. *See id.* art. 3.4, 3.5.

50. *Id.* art. 3.4.

51. Dernbach & Widener Univ., *supra* note 7, at 10,003.

52. *See id.*

53. *Id.* at 10,003-05.

provides a similar set of co-benefits; however, at the moment, energy efficiency and conservation generally can provide those co-benefits at a lower cost in areas where there is already access to modern energy.⁵⁴

For developing countries, there is also an expectation that their per capita emissions will rise as their economies grow. Put differently, the Parties agreed that developing countries would not be locked into poverty or low-development status by the atmosphere's limited ability to receive greenhouse gas emissions without causing adverse climate change effects.⁵⁵ The Convention's preamble states that: "per capita emissions in developing countries are still relatively low and . . . the share of global emissions originating in developing countries will grow to meet their social and development needs."⁵⁶ For developing countries, then, the right to promote sustainable development embraces continued economic development. Economic development is more likely to the extent that energy and greenhouse gas intensities in developing countries are lower.

For developed countries, a primary object is to make their existing high levels of development more sustainable. That means reducing their disproportionately high greenhouse gas emissions so that per capita emissions in developed and developing countries converge. The right to promote sustainable development reinforces developed country leadership because it means that developed countries should create attractive and replicable models of sustainable energy use.

B. What These Duties Mean for Nations

These three duties mean, of course, that developed countries should reduce their energy consumption in ways that demonstrate developed country leadership, that are equitable for developing and vulnerable countries, and that are consistent with the right to pursue sustainable development. While these principles by themselves do not point to a particular level of reduction, other provisions in the Convention provide clues about how these duties should be carried out. The overall objective in the exercise of these duties, of course, is stabilization of atmospheric concentrations of greenhouse gases at a level that is not dangerous.

54. See THOMAS M. LENARD, TECH. POLICY INST., RENEWABLE ELECTRICITY STANDARDS, ENERGY EFFICIENCY, AND COST-EFFECTIVE CLIMATE-CHANGE POLICY 6, 13-14 (2009), available at http://techpolicyinstitute.org/files/renewable_electricity_standards.pdf (noting that increasing energy efficiency would often prove more economical than constructing new renewable energy sources).

55. See Framework Convention, *supra* note 8, pmbl.

56. *Id.* pmbl.

While the parties to the Convention have not determined a specific concentration of greenhouse gases that is considered to be safe, analysis by the IPCC indicates that lower concentrations are safer than higher concentrations.⁵⁷ Moreover, the Convention states: “Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing [cost-effective] measures.”⁵⁸

These provisions lead to several conclusions. First, because climate change does present such threats, nations should reduce energy consumption—through efficiency and conservation measures—to the extent that it is cost effective for them. And this is particularly important for conservation and efficiency policies and measures because, as already explained, they are the most likely of all climate change options to be cost effective.⁵⁹ Cost effectiveness is not a fixed concept, however. It can vary based on the assumptions such as the length of an acceptable payback period. It also varies over time; measures that are not cost effective now may be cost effective in the future based on developments in technology and know-how as well as the cost of alternatives. So there is a reasonable probability, based on historical experience, that new energy efficiency and conservation measures will become cost effective over time.

Second, part of the duty of developed countries is to create replicable models of sustainable development that are attractive to developing countries. It is difficult to see how that can be done by developed countries without reducing energy consumption. Indefinite growth in energy consumption is not sustainable. Consumption of energy by developing countries at the same per-capita rate as developed countries is likely not even attainable, much less sustainable. It is profoundly unethical for the United States and other developed countries to model a lifestyle to the rest of the world that depends on a high level of energy consumption that developing countries cannot attain and that could not be sustained by the world’s entire population. The United States and other developed countries have a duty to model the good life based on a level of energy consumption—a much lower level of energy consumption—that the rest of the world could also attain.

57. IPCC: MITIGATION, *supra* note 3, at 32 (“Projected anthropogenic climate change appears likely to adversely affect sustainable development, with the effects tending to increase with higher GHG concentrations.”) (citation omitted).

58. Framework Convention, *supra* note 8, art. 3.3.

59. See *supra* notes 51-53 and accompanying text.

Third, the obligation to reduce greenhouse gas emissions to a non-dangerous level may require an 80% reduction of greenhouse gas emissions by 2050.⁶⁰ That suggests the need of developed countries to employ a broad suite of measures sufficient to achieve that goal. Because the Convention is suffused with sustainable development concepts, including the right of all nations to pursue sustainable development, it follows that nations should privilege those measures that foster sustainable development. That is, they should choose measures that reduce greenhouse gas emissions, create new jobs, foster the development of new technology, reduce the impact of energy prices on individuals (particularly low-income persons) as well as businesses, and reduce other pollutants. While a great many types of measures can do that, energy efficiency and conservation are predominant.

Fourth, and finally, the developed country responsibility to treat developing and vulnerable countries with equity and the right of developing countries to pursue sustainable development suggests the importance of developed country measures that will not harm developing countries. The adverse effects of climate change in developing countries, including droughts and heat waves, interfere with their right to pursue sustainable development, and even any development. Thus, the measures taken by developed countries, including reductions in energy consumption, need to be sufficient to minimize adverse effects on developing countries.

This is not to say that developing countries have no responsibilities regarding energy consumption at all. Only two of the three principles—the duty of developed country leadership and the duty to treat developing and vulnerable countries equitably—are limited to developed countries.⁶¹ The third principle—the right to pursue sustainable development—is held by both developed and developing countries.⁶² To be very sure, the provision of energy to people in developing countries who are not now served by modern energy is an important goal, and one contemplated by the Convention. But whatever else that right means, it suggests that both the provision of modern

60. IPCC: MITIGATION, *supra* note 3, at 775, 776 box 13.7. The IPCC has described a range of different stabilization scenarios for atmospheric concentrations of greenhouse gases, ranging from 445-490 parts per million to 885-1130 parts per million of carbon dioxide equivalent gases. *Id.* at 15 tbl.SPM.5. To achieve low to medium stabilization levels, developed countries would need to reduce their emissions by 10% to 40% below 1990 levels by 2020 and by 40% to 95% below 1990 levels by 2050. *Id.* at 90. Achieving an even higher stabilization level could require reductions from developed countries by as much as 25% by 2020 and 80% by 2050. *Id.* at 776 box 13.7.

61. Framework Convention, *supra* note 8, art. 3.

62. *Id.*

energy and climate change mitigation ought to be as consistent with sustainable development as possible. That suggests the importance of improving energy efficiency in developing countries where it is cost effective to do so. It also suggests the importance of using the most efficient modern energy consistent with sustainable development as well as the use of appropriate conservation measures.

C. What These Duties Mean for Individuals and Other Entities

Because these duties are borne by parties to the Convention, it follows that they are not directly imposed on sub-national governments, private entities, or individuals. It is surely possible for national governments to adopt laws implementing the Convention that reflect these principles. In that case, these principles or duties would have direct impact on individuals and other entities. It is also possible for nations, including the United States, to engage individuals and organizations to participate actively in mitigating climate change and reducing energy consumption through legislation, public education, or other means.

In the absence of some implementing legislation, however, individuals and others may not respond effectively to appeals made on the basis of the Convention principles. These principles and duties may be proxies for traditional and better-understood ethical principles—useful to the parties to the Convention because they are more precise and context specific than similar traditional ethical principles. The Convention's principles, broadly understood—leadership, equity, and sustainable development—will resonate with some constituencies. Still, it is difficult to see how these principles would be as effective in engaging the public as either traditional ethical principles or a combination of traditional principles and the Convention principles.

III. TRADITIONAL ETHICAL PRINCIPLES

Traditional ethical principles also support the conclusion that developed countries as well as some groups, organizations, regional and local governments, and individuals should reduce their energy consumption. As we shall see, these ethical obligations create responsibilities to reduce energy demand that prevent some entities from making energy use decisions based upon self-interest alone.

What traditional ethical principles are relevant to guiding behavior on energy consumption? Before identifying some of these ethical principles, it is helpful to describe certain limitations of traditional

ethical reasoning that need to be acknowledged when thinking about climate change ethical issues.

Identifying ethical issues raised by potential harms from human actions does not necessarily lead to agreement about what ethics requires. This is so because ethical theories often differ about what ethics requires. One may, for instance, look to utilitarian, rights-based, biocentric, ecocentric, or relationship-based ethical theories, just to name a few, to guide ethical conclusions.⁶³ Yet these theories may reach different conclusions about what ethics requires under the same facts. Therefore, ethical issue spotting does not necessarily lead to ethical consensus.

However, for some human problems there is an overlapping consensus among ethical theories about what ethics requires even though foundational ethical theories differ.⁶⁴ An overlapping consensus occurs when varying ethical theories lead to the same conclusion.⁶⁵ For other human problems, although there is no overlapping consensus about what ethics requires, most ethical theories would agree that relevant existing behaviors are ethically problematic. That is, ethical criticism of the status quo is possible even if there is no overlapping consensus on what ethics requires. And so, identification of ethical issues may lead to: (1) conflict about what ethics requires; (2) overlapping consensus about what ethics requires; or (3) overlapping consensus that a proposed activity is ethically problematic despite no consensus on what ethics requires. On some issues in this Part, our conclusions are based upon an overlapping consensus among ethical theories; on other issues the Article spots ethical issues without reaching conclusions on what ethics requires.

A. The Duty to Do No Harm

Ethics requires that people refrain from seriously harming others and refrain from putting people at risk of serious harm who have not consented to being put at risk. These ethical obligations are particularly strong when the potential harm is significant. This ethical duty is believed to be a matter about which there is overlapping consensus among major ethical theories, particularly if the harm experienced by

63. For a discussion of differences in ethical reasoning among different ethical theories, see generally JEFFREY OLEN & VINCENT BARRY, *APPLYING ETHICS* 3-69 (7th ed. 2002).

64. BROWN ET AL., *supra*, note 9, at 9.

65. JOHN RAWLS, *A THEORY OF JUSTICE* 340 (rev. ed. 1999).

others is death or serious damage to human health.⁶⁶ However, some consequentialist ethical theories, including some forms of utilitarianism, would allow for a balancing of harms and benefits.⁶⁷ Yet, many utilitarians acknowledge duties not to seriously harm others although they derive this duty on the basis of a calculation of the greater good to the greater number, not on unchanging ethical rules.⁶⁸ In addition, many utilitarians would require that those who would be harmed by the actions of others be compensated for the harm done to them while also agreeing that those who could be greatly harmed by the actions of others have a right to consent to being put at serious risk of harm.⁶⁹ And so many utilitarians often recognize that those who may be greatly harmed by others have rights to fully-informed consent about being put at risk.⁷⁰ Yet many individuals and countries being harmed by climate change have never consented to being put at risk.

Ethical duties entailed by any potential environmental problem, including climate change, are often believed to be in proportion to the nature and magnitude of the potential harms caused by relevant human activities. If so, climate change creates particularly strong duties. This is so because there is growing evidence that climate change is already causing great harm to large numbers of people around the world while threatening hundreds of millions of others in the years ahead. For instance, a recent report found that human-induced climate change is already responsible for 300,000 deaths per year and is now affecting 325 million people around the world.⁷¹ This report also projects that increasingly severe heat waves, floods, storms, and forest fires will be responsible for as many as 500,000 deaths per year by 2030, “making it the greatest humanitarian challenge of our time.”⁷² According to this report, current economic losses due to climate change today amount to more than \$125 billion per year—more than the humanitarian aid

66. BROWN ET AL., *supra* note 9, at 9.

67. See KRISTIN SHRADER-FRECHETTE, ENVIRONMENTAL JUSTICE: CREATING EQUALITY, RECLAIMING DEMOCRACY 15, 29 (2002).

68. See *id.* at 29, 168-69; John Stuart Mill, *Utilitarianism*, in OLEN & BARRY, *supra* note 63, at 35.

69. For a discussion of duties to prevent harm to others and rights to fully-informed consent, based on a utilitarian perspective, see generally SHRADER-FRECHETTE, *supra* note 67.

70. *Id.* at 108 (applying the utilitarian doctrine of free informed consent to future persons harmed by environmental risks such as nuclear waste disposal).

71. GLOBAL HUMANITARIAN FORUM, *supra* note 44, at 1, 9, 11.

72. *Id.* at 2, 12-13.

distributed worldwide in 2008.⁷³ By 2030, the report says, climate change could cost \$340 billion per year.⁷⁴

Because of the great harm to some people and nations that is already being caused by greenhouse gas emissions, no nation that is already exceeding its fair share of safe global emissions may delay taking steps to reduce its emissions on the basis that new, less costly technologies may be invented in the future.⁷⁵ For this reason, no nation exceeding its fair share of safe global emissions may defer action to reduce its emissions on the basis that unproven technologies such as geologic carbon storage or hydrogen power may prove to be effective in the future. If, hypothetically, it were truly impossible to reduce emissions, such a fact might be a defense to obligations to immediately reduce emissions. However, where it is possible to do so, each nation exceeding its fair share of safe global emissions has an ethical duty to take steps that will as quickly as possible reduce its emissions to its fair share of safe global greenhouse gas emissions.

Ethical duties are not satisfied by considerations of narrow self-interest alone. In other words, if duties exist to reduce greenhouse gas emissions to a nation's fair share of safe global emissions, the duty-holder does not determine the magnitude of this obligation by looking at harms and benefits that accrue only to the duty-holder. Ethics requires that the duty-holder acknowledge its responsibility to reduce the harms to others that are caused by the duty-holder's behavior. This is not to deny that thinking of the effects of one's behavior on others may also be in one's self-interest (or enlightened self-interest), but only to claim that reducing harms to others caused by the duty-holder is an essential criteria for satisfying ethical responsibilities.

B. What This Duty Means for Nations

The responsibility to reduce unnecessary consumption is a corollary of the ethical duty to prevent great harm to others, which is already occurring. Because reduction in energy consumption is an option for all nations and does not necessarily require payment for new costly technologies, each nation exceeding its fair share of safe global emissions is ethically obligated to reduce energy consumption unless it can reduce its greenhouse emissions to levels required of it by other means. Although one can not authoritatively say as a matter of ethics

73. *Id.* at 18 (citation omitted).

74. *Id.* at 20.

75. BROWN ET AL., *supra* note 9, at 33.

when the duty to reduce energy demand is satisfied, this does not lead to the conclusion that status quo approaches to energy conservation are entitled to respect. At a minimum, a nation has an ethical responsibility to eliminate unnecessary energy use.

The determination of each nation's fair share of safe global emissions is an ethical issue beyond the scope of this Article and an issue about which different respected distributive justice theories lead to different conclusions.⁷⁶ Nevertheless, despite valid disagreements about what ethics requires quantitatively of developed nations to reduce emissions, it is not possible for most of them to credibly argue that they are currently emitting at levels below their fair share of safe global emissions. This is so because the world needs to reduce emissions by as much as 80% from existing levels to stabilize greenhouse gases in the atmosphere at safe levels and because developed nations are very high emitters compared to developing countries.⁷⁷ In the case of developed nations, ethical analysis can lead to strong criticism of status quo emissions levels even if there is reasonable disagreement about what theories of justice should be followed to allocate national targets. On the other hand, some developing nations may be able to expand emissions levels without exceeding their fair share of safe global emissions because their current emissions levels are very low compared to developed countries.

For these reasons, developed nations should acknowledge their duty to no longer delay in reducing their greenhouse gas emissions to levels that would constitute their fair share of safe global emissions. In fulfilling this responsibility, a case can be made that this duty is strongest where energy is being used for non-essential, non-subsistence needs. Following the argument made by philosopher Henry Shue, a strong ethical claim can be made that there exists a duty to eliminate emissions generated for "luxury" uses as distinguished from emissions generated to meet "subsistence" needs.⁷⁸ In other words, there is a particularly strong ethical responsibility to reduce energy consumption from non-essential activities. Following this line of reasoning, we have a particularly strong duty to eliminate energy use that serves no purpose, especially when energy is wasted. Next in order of priority is the duty to eliminate energy use for diversionary amusement or other trivial

76. For a discussion of the justice of allocating emissions levels among countries, see *id.* at 19-23.

77. See *supra* note 60 and accompanying text.

78. See HENRY SHUE, BASIC RIGHTS: SUBSISTENCE, AFFLUENCE, AND U.S. FOREIGN POLICY 23-25 (1980).

pursuits. If these duties were taken seriously, we should choose the option that consumes the least energy when we have a reasonable ability to do so.

In developed countries such as the United States that have high energy use, a variety of studies indicate the potential for cost savings and reduced greenhouse gas emissions through energy efficiency and conservation.⁷⁹ In addition to improving the efficiency of existing residential and commercial buildings, two of the most commonly known tools are improved fuel efficiency standards for motor vehicles and more stringent efficiency standards for appliances and equipment.⁸⁰ Other policies and measures include expanded use of rail freight, public benefit funds for electricity, real-time pricing for electricity use, fuel taxation, and transit-oriented development.⁸¹ The reduced energy consumption available from the intensive and coordinated use of these and other efficiency and conservation tools is so great that they might even enable the United States to stabilize and then reduce its energy use over the next decade or two.⁸² Because carbon dioxide emissions from fossil fuels constitute the overwhelming majority of U.S. greenhouse gas emissions,⁸³ stabilizing U.S. energy consumption would go a long way toward stabilizing the growth in U.S. greenhouse gas emissions.

A 2007 analysis of 250 greenhouse gas mitigation options in the United States makes a similar point. This analysis, performed by McKinsey & Company for The Conference Board,⁸⁴ concluded that the United States could reduce its greenhouse gas emissions by 3.0 to 4.5 gigatons by 2030 over business-as-usual projections “using tested approaches and high-potential emerging technologies.”⁸⁵ This reduction would mean that U.S. greenhouse gas emissions in 2030 could be 7% to 28% lower than 2005 emissions.⁸⁶ Forty percent of these reductions, the study concluded, could be accomplished at a negative marginal cost over their life cycle.⁸⁷

79. Dermbach & Widener Univ., *supra* note 7, at 10,003, 10,028-30 (2007).

80. *Id.* at 10,014.

81. *Id.* at 10,017-27.

82. *Id.* at 10,028-29.

83. U.S. ENVTL. PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990-2005, at ES-4 to ES-5 tbl.ES-2 (2006), available at <http://www.epa.gov/climatechange/emissions/downloads06/07ES.pdf>.

84. MCKINSEY & CO., REDUCING U.S. GREENHOUSE GAS EMISSIONS: HOW MUCH AT WHAT COST?, at v. (Jon Creyts et al. eds., 2007), available at http://www.mckinsey.com/client-service/ccsi/pdf/US_ghg_final_report.pdf.

85. *Id.* at ix.

86. *Id.* at xii.

87. *Id.*

Thus, significant energy consumption reductions are already easily achievable. Following Shue's logic, all energy use choices should be guided by the principle of eliminating unnecessary energy use.⁸⁸ This logic also supports the development of energy conservation strategies while supporting the claim that fossil fuel derived energy should only be used where no reasonable alternative is available.⁸⁹

How far must the duty-holder go in meeting relevant obligations? This is a separate question about which different ethical theories may reach different conclusions. One could argue as a matter of ethics, for instance, that the duty to reduce greenhouse gas emissions from non-essential activities is required even if one is not exceeding one's fair share as long as increased emissions from all sources would continue to harm others. This obligation is entailed by the idea that a nation that has the power to reduce great harm to others should do so even if the harm is not directly attributable to that nation's excessive behavior. Under this theory, if a nation knew that its additional greenhouse emissions would harm others even though that party was well below its fair share of safe global emissions, the nation should not contribute to the additional harm. Under such an approach, developing countries should reduce their greenhouse gas emissions if they have real options to do so, even when their emissions do not exceed their fair share of safe global emissions. Under this ethical theory, it is the *ability* to reduce harm that creates the obligation to do so.

C. What This Duty Means for Individuals and Other Entities

Under the Convention, as we have seen, nations are duty-holders to reduce emissions within their jurisdiction. What can be said about the duties of regional and local governments, organizations, businesses, and individuals? Because emissions that cause climate change are under the control of all of these entities, all groups and individuals have responsibilities to limit their harm-causing emissions to their fair share of safe global emissions without regard to whether their nation has acted. Yet, as was the case for nations, different theories of distributive justice would reach different conclusions about each entity's fair share. However, as was also the case for national governments, some high emitting groups cannot reasonably argue that they are not currently

88. See *supra* note 78 and accompanying text.

89. See Framework Convention, *supra* note 8, at art.3.

exceeding their fair share of safe global emissions. The reasons are several: (1) their emissions levels are high; (2) huge reductions in emissions are necessary to achieve safe atmospheric stabilization levels; and (3) climate change damages are already occurring.

National governments have the authority to allocate national responsibilities among organizations, businesses, and lower levels of government. If nations did this, and an entity was complying with its nationally allocated emissions level, that entity could make a respectable argument that it was complying with obligations to not exceed its fair share of global emissions (assuming that the national goal represented a fair share of safe global emissions). In other words, higher level governments can affect private and lower government obligations.

As of this writing, the United States is engaged in an intensive debate about national climate change legislation—legislation that would also affect the duties and responsibilities of states, local governments, the private sector, and individuals.⁹⁰ Policies and measures directed at human lifestyle and behavior are particularly important because, for example, about one-third of the energy consumed in the United States “is directly controlled by households.”⁹¹ By another estimate, activities that are under the “direct, substantial control of the individual and that are not undertaken in the scope of the individual’s employment” are responsible for about one-third of U.S. greenhouse gas emissions and 8% of global greenhouse gas emissions.⁹² Thus, at least in developed countries, lifestyle and behavior changes could lead to significant reductions in greenhouse gas emissions in the short-term. Many policies and measures are available to engage individuals, particularly on energy efficiency and conservation.⁹³

90. See, e.g., American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

91. Paul C. Stern & Gerald T. Gardner, *Psychological Research and Energy Policy*, 36 AM. PSYCHOLOGIST 329, 336 (1981); see also Hope M. Babcock, *Assuming Personal Responsibility for Improving the Environment: Moving Toward a New Environmental Norm*, 33 HARV. ENVTL. L. REV. 117, 121 (2009) (“[O]ne-third of the energy consumed in this country is used by households.”); John C. Dernbach, *Overcoming the Behavioral Impetus for Greater U.S. Energy Consumption*, 20 PAC. MCGEORGE GLOBAL BUS. & DEV. L.J. 15, 19 (2007) (describing policy efforts to improve the energy efficiency of appliances and related equipment); Loren Lutzenhiser, *Social and Behavioral Aspects of Energy Use*, 18 ANN. REV. ENERGY & ENV’T 247, 248 (1993) (discussing the upward trend in average household consumption); Michael P. Vandenbergh & Anne C. Steinemann, *The Carbon-Neutral Individual*, 82 N.Y.U. L. REV. 1673, 1673 (2007) (providing evidence that individuals contribute roughly one-third of carbon-dioxide emissions in the United States).

92. Vandenbergh & Steinemann, *supra* note 91, at 1690, 1694.

93. John C. Dernbach, *Harnessing Individual Behavior to Address Climate Change: Options for Congress*, 26 VA. ENVTL. L.J. 107, 114-25 (2008). These include public reporting of greenhouse

Yet, in the absence of a national allocation, groups and individuals within the nation still have a duty to limit their emissions to their fair share of safe global emissions despite legitimate differences about what fairness requires. For this reason, states, counties, local governments, organizations, businesses, and individuals have an ethical duty to eliminate unnecessary use of energy that increases greenhouse gas atmospheric levels just as nations do. Although these groups may reasonably disagree on what is their fair share, they many not deny that they have a duty to reduce their emissions below existing levels. If we, for instance, have two cars that consume two different amounts of energy and both are available, we should choose the car that consumes less energy, all other considerations being equal. If we can walk, rather than drive, we should walk.

The duty to reduce unnecessary energy consumption is not simply a matter of personal self-interest (although it very well may be). Rather, the responsibility to reduce energy consumption exists even if the harms of climate change to the duty-holder may be minimal and even if the duty holder must bear some inconvenience in meeting its responsibility. Moreover, the duty to reduce energy consumption does not turn on the fact that reducing consumption may increase jobs for the duty-holder, prop up the economy, or otherwise create benefits for the duty-holder (although this, too, very well may be true).

IV. CONCLUSION

This Article has shown that developed countries in particular have an obligation to reduce energy consumption. This Article also suggests that developing countries have an obligation to reduce energy consumption from existing uses of energy.

The Convention and traditional ethics begin from somewhat different starting points. The Convention would have countries reduce greenhouse gas emissions to avoid or minimize dangerous human interference with the climate system. A basic touchstone for traditional ethics, at once more general and more challenging, is to do no harm.

Neither the Convention nor traditional ethics provides an exact statement of the required reduction in energy consumption. Still, an

gas emissions, mandatory disclosure of the greenhouse gas effects of particular consumer products, public information on the greenhouse gas effects of various personal decisions, public information on climate change effects in particular regions, tax incentives for the purchase of energy-efficient products, and rules providing for the distribution of allowances from an emissions trading system to individuals and businesses that have substantially reduced their greenhouse gas emissions. *Id.* at 144-55.

outline of required efforts under the Convention is discernible. Developed countries should reduce energy use through efficiency and conservation to the extent it is cost effective. They should help foster models of the good life that are based on much lower energy consumption levels. And they should address climate change in ways that foster sustainable development—through job creation, cost savings, and the like—and reduce adverse impacts of climate change in developing countries. These provide a framework that national governments could employ to address energy consumption. Traditional ethics, by contrast, provides a more basic message: reduce unnecessary consumption.

The Convention's principles would apply to sub-national governments, corporations, individuals, and others, but only to the extent required by national governments. And they are likely to be less compelling, especially to individuals. The obligation from traditional ethics to reduce energy consumption, by contrast, applies to individuals and others regardless of the enactment of national legislation, and is more likely to be understood by individuals.

Developing countries have duties concerning energy consumption as well. To be sure, the right to pursue sustainable development entails a set of responsibilities for fostering human quality of life that will mean greater use of modern energy, particularly where no such energy is available. Still, developing countries should employ energy efficiency and conservation when, at a minimum, it is cost effective to do so. Traditional ethics suggests a similar duty—to use energy efficiency and conservation when that option is available.

Throughout this analysis, the ethical preference for energy conservation and efficiency is based on the comparative ease with which such measures can be implemented. As a group, energy conservation and efficiency policies and measures are the cheapest and most beneficial of all—reducing the environmental, security, social, and economic costs of energy consumption. Reducing energy consumption is not just the smart thing to do; it is also the right thing.