

The overwhelming majority of the world's climate scientists hold that the Earth's climate is changing and, moreover, that these changes are human-induced. The Intergovernmental Panel on Climate Change (IPCC) reports that in the period from 1980–1999 to 2090–2099 temperatures are “likely” to rise by between 1.1 and 6.4°C and sea levels may rise by up to 59 cm.¹ Since the driver of these climatic changes is the emission of greenhouse gases, there is a strong imperative to limit the emission of these gases.

This, however, prompts an important ethical question: How should the right to emit greenhouse gases be distributed? We need to know who bears the responsibility to reduce emissions, but to answer this we must have an account of what constitutes a fair share of greenhouse gas emissions. One useful way of bringing out what is at stake is provided in a recent article by Myles Allen, David Frame, and their coauthors. They

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1. Susan Solomon, Dahe Qin, and Martin Manning, “Technical Summary,” in *Climate Change 2007: The Physical Science Basis: Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Susan Solomon, Dahe Qin, Martin Manning, Melinda Marquis, Kristen Averyt, Melinda M. B. Tignor, Henry LeRoy Miller, and Zhenlin Chen (Cambridge: Cambridge University Press, 2007), p. 70.

argue that if humanity emits fewer than one trillion metric tons of carbon in the period between 1750 and 2500, then there is a 50 percent chance of avoiding dangerous climate change (defined as a 2°C increase over pre-industrial times). They add that approximately half of this figure has been emitted, so humanity is left with just under half a trillion metric tons of carbon to emit.²

Whether this is the correct account of the available greenhouse gas budget will depend on a number of normative and empirical assumptions, such as whether the 2°C target is an appropriate one and whether a 50 percent chance of avoiding it is too high a risk. So determining the precise size of the greenhouse gas budget will be very complex and rest on ethical assumptions that need defending. The key point, though, is that there should be a “greenhouse gas budget.” In light of this, my question here is: Given that there is a fixed limit on the volume of greenhouse gases that may be permissibly emitted, how should rights to emit greenhouse gases be distributed?³ In what follows, I examine the answer that is most commonly given by environmental activists and by those philosophers who have considered the question (section III). I argue that none of the defenses of this approach succeeds and, moreover, that it is vulnerable to two powerful objections (sections IV–VII). At the end of the article, I outline an alternative way of thinking about the distribution of greenhouse gas emissions (section VIII).

I. EMPIRICAL AND THEORETICAL BACKGROUND

In order to examine the question of how to distribute rights to emit greenhouse gases, it is essential to make two kinds of preliminary points. First, it is helpful to put this question into context and to draw attention to other responsibilities associated with addressing climate change. Second, it is necessary to introduce two distinctions that will frame the ensuing discussion.

2. Myles R. Allen, David J. Frame, et al., “Warming Caused by Cumulative Carbon Emissions towards the Trillionth Tonne,” *Nature* 458 (2009): 1163–66. This explicitly sets aside other greenhouse gas emissions (p. 1166).

3. Note my focus is on the fair distribution of *permits to emit greenhouse gases*, rather than the fair distribution of the *actual emission of greenhouse gases*. If one allows emissions trading, as I think one should, then the former is not the same as the latter. See Simon Caney and Cameron Hepburn, “Emissions Trading: Unethical, Ineffective and Unjust?” *Royal Institute of Philosophy Supplement* 69 (2011): 201–34.

A. Climatic Responsibilities

I begin first by drawing attention to other climatic responsibilities. The focus of this article is directly related to one key responsibility, namely, the responsibility to limit the emission of greenhouse gases. We can, however, identify at least three distinct kinds of responsibility.

The first is commonly referred to as “Mitigation.” Following the IPCC, I define this as “an *anthropogenic* intervention to reduce the anthropogenic forcing of the *climate system*; it includes strategies to reduce *greenhouse gas sources* and emissions and enhancing *greenhouse gas sinks*.”⁴ Mitigation thus has two parts. The first, the primary focus of this article, involves limiting the flow of greenhouse gas emissions so that the stock does not exceed a certain level. However, Mitigation also includes maintaining greenhouse gas sinks (for example, forests), which, in turn, involves opportunity costs, such as foregoing the benefits derived from using the wood (for fuel, paper, furniture, or buildings) and using the land (for farming or building houses), as well as the income that would have been earned by those uses.

There is a consensus among climate scientists that Mitigation alone is insufficient. Given the volume of greenhouse gases that have been emitted, we are already committed to some climate change. In virtue of this, there is an ethical imperative that we—humanity—take steps necessary to ensure that any climatic changes that occur do not undermine what people are entitled to do as a matter of justice. In the terminology employed by climate scientists, “Adaptation” is required. I define “Adaptation” as follows: where an agent is threatened by a climatic change, an action counts as Adaptation if it prevents that climatic change from undermining or restricting that agent’s ability to do what they are entitled to do. Familiar examples of Adaptation include building seawalls to protect communities from rising sea levels and storm surges, or inoculating people against infectious diseases in cases where climatic changes increase the transmission zone of a given disease, or designing drainage systems so they can function in the face of

4. Martin Parry, Osvaldo Canziani, Jean Palutikof, Paul van der Linden, and Clair Hanson, eds., “Appendix 1: Glossary,” in *Climate Change 2007: Impacts, Adaptation and Vulnerability—Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge: Cambridge University Press, 2007), p. 878.

increased precipitation. Estimates of the costs of Adaptation vary. However, to give some sense of the figures involved, we might note that a report commissioned by the United Nations Framework Convention on Climate Change (UNFCCC) found that “global investment needs for adaptation could amount to \$49–\$171 billion per annum by 2030, of which about half would accrue in developing countries.”⁵

In addition to Mitigation and Adaptation, there is also a need for “Compensation.” Suppose that there is insufficient Mitigation (that humanity does not reduce its emissions sufficiently to achieve a safe concentration level of greenhouse gases in the atmosphere); and suppose that there is insufficient Adaptation (so that the climatic changes prevent people from doing that which they are entitled to do). In such a case, Compensation is required.

My aim, I should stress, is not to provide an exhaustive account of the responsibilities generated by the prospect of dangerous climate change.⁶ It is merely to draw attention to some of the other tasks that need to be addressed.

B. Methodological Preliminaries

Having described the situation facing humanity, I wish to introduce two distinctions that will help frame my analysis.

The first distinction is encapsulated in the following question: Should we consider each of the three kinds of responsibility listed above separately and formulate a principle for each? Or should we consider them as a total package of responsibilities and then propose a principle governing that total package? Let us call the position that we should treat each of the responsibilities separately an “Atomist” position and the position that we should treat them all en masse a “Holist” position. When considering the fair distribution of greenhouse gases, we can thus treat

5. Samuel Fankhauser, “The Costs of Adaptation,” *WIREs Climate Change* 1 (2010): 26–27.

6. Other responsibilities include funding the development and transfer of clean technology to enable developing countries to develop without triggering dangerous climate change. Much more controversially, some might argue that an additional responsibility is the responsibility to employ some kind of geoengineering such as Solar Radiation Management or Carbon Dioxide Removal. For simplicity’s sake (and because my arguments do not require me to consider these other kinds of responsibilities), I focus solely on the responsibilities mentioned in the text.

this in an Atomist fashion or a Holist fashion or according to some intermediate position (for example, one that treats two climate responsibilities together as a package and a third separately).

Consider now a second question: When allocating climate responsibilities, should we treat them in *isolation* from considerations about global and intergenerational justice in general (including issues such as trade, development, poverty, and health)? Or should we treat the ascription of climate responsibilities in *conjunction* with considerations about global and intergenerational justice in general? The first position practices what we might term a “Method of Isolation”: it isolates the responsibilities associated with climate change from a consideration of other issues (like poverty, trade, and development). A second position practices what we might term a “Method of Integration”: it treats climatic responsibilities in light of a general account of global justice.⁷

All accounts of how to distribute emissions rights take a stance, either explicit or implicit, on the two methodological issues introduced above.

II. THE EQUAL PER CAPITA VIEW

Having drawn attention to these two key methodological issues, we can now turn to the question of how to distribute emission rights. I shall begin this normative inquiry by examining a widely held account of the fair distribution of the right to emit greenhouse gas emissions. Roughly stated, the account in question holds that a just distribution of the right

7. Note that the distinction between Integrationism and Isolationism can be defined and applied in a number of different ways. In this article, I apply the distinction solely to the question of how permits to emit greenhouse gases should be distributed. We might, though, apply this distinction in a more general way that is not tied specifically to the distribution of emission permits. Someone might argue, for example, that we should embed discussions of climate justice—including questions such as whether we should devote resources to eradicating poverty in developing countries (thereby enabling them to adapt) rather than to mitigating climate change—within a more general account of justice. As an anonymous referee reminded me, Thomas Schelling has long argued that climatic harms should be compared with other harms and so is an Integrationist in this more expansive sense. See Schelling, “Intergenerational and International Discounting,” *Risk Analysis* 20 (2000): 833–37. For a fuller discussion of the different ways one can define and apply the distinction between Integrationism and Isolationism, see Derek Bell and Simon Caney, *Global Justice and Climate Change* (Oxford: Oxford University Press, forthcoming), chap. 1. For a similar distinction, see the illuminating discussion in Samuel Scheffler, *Boundaries and Allegiances: Problems of Justice and Responsibility in Liberal Thought* (Oxford: Oxford University Press, 2001), esp. pp. 166–70 and 190–92.

to emit greenhouse gases is one in which the permits to emit greenhouse gases are distributed according to a principle of equality. This view is an Atomist approach, for it applies a principle of justice to the distribution of greenhouse gases on its own and without considering all the other climate-related responsibilities. And, it is an Isolationist approach, for it treats the question of the fair distribution of emissions in isolation from all other issues in global (or intergenerational) justice. The equal per capita view is, perhaps, the dominant view among environmental philosophers and activists.⁸ I argue, however, that it is unpersuasive.

Before we turn to examine the arguments for and against the egalitarian approach to greenhouse gas emissions, it is essential to note that there is in fact a wide variety of similar but nonidentical views, all of which can plausibly be said to adopt an egalitarian approach to greenhouse gas emissions. The equal per capita view is, strictly speaking, a family of related views. Those who subscribe to its key tenet differ on at least three issues: the *scope* of the scheme, the *nature of the fundamental rights-bearer*, and the *attitude to past emissions*.

(1) Consider first differences about the *scope* of the scheme. We can distinguish, here, between “global” and “domestic” versions, where the global version holds that this ideal should be applied across the whole world, whereas the domestic version applies it within the state.

(2) Second, among those who subscribe to the global version, there is disagreement about *the nature of the fundamental (or basic) rights-bearer*. Who possesses the *fundamental* (as opposed to *derivative*) moral right to emit greenhouse gases?⁹ Some adopt an individualist position,

8. For a critique of the equal per capita view that is different in nature from mine, see Eric Posner and David Weisbach, *Climate Change Justice* (Princeton, N.J.: Princeton University Press, 2010), chap. 6. I do not find their critique or their proposed alternative persuasive, but I lack the space to engage in a substantive analysis of their view here.

9. What I am terming the “fundamental rights-holder” should be contrasted with what we might term “derivative rights-holders.” (My account here is indebted to Joseph Raz’s discussion of what he terms “core” and “derivative” rights: Raz, *The Morality of Freedom* [Oxford: Clarendon Press, 1986], pp. 168–70. However, my account is different in some respects from Raz’s account.) As I define the term, X is a *fundamental* rights-holder with respect to some domain of action if X has a right in virtue of features of X’s person (for example, their “interests” on an interest theory of rights) and the nature of the corresponding demands imposed on others. By contrast, X is a *derivative* rights-holder with respect to some domain of action if we grant X some right as a means of protecting some person’s fundamental moral rights. X’s status as a derivative rights-holder is thus always ultimately grounded with reference to fundamental moral rights.

holding that each individual is the ultimate rights-holder.¹⁰ Others, however, might take a statist approach and hold that the fundamental moral rights to emit are possessed by states.¹¹

(3) Third, those who adhere to the equal per capita view differ in the extent to which they think that the current and future distribution of emission rights should take into account past emissions. Speaking very roughly, and at some simplification, one can identify three schools of thought. First, there are those who adhere to what we might term a wholly “history-insensitive” approach. Steve Vanderheiden, for example, argues that it would be unjust to take past emissions into account when determining the distribution of current and future greenhouse gas emissions.¹² A second, history-sensitive approach argues by contrast that current and future allocations of emission rights should take past emissions into account, holding that those with a history of higher than equal emissions should have fewer emissions in the future.¹³

A third view also adopts a history-sensitive approach but, unlike the second view, holds that those who have emitted more than equal amounts of greenhouse gases in the past should, at least for a short period, continue to have more than equal shares and that we move toward equality over time.¹⁴

I shall pass no comment on any of the three issues identified above. My aim here is simply to bring out the fact that what I am terming the “equal per capita” approach is a broad church. It is united in the belief that the fair share of emission rights should be governed, in some sense,

10. Dale Jamieson, “Adaptation, Mitigation, and Justice,” in *Perspectives on Climate Change: Science, Economics, Politics, Ethics*, ed. Walter Sinnott-Armstrong and Richard B. Howarth (Amsterdam: Elsevier, 2005), p. 231.

11. See Aubrey Meyer, *Contraction and Convergence: The Global Solution to Climate Change* (Foxhole, Devon: Green Books, 2000).

12. Steve Vanderheiden, *Atmospheric Justice: A Political Theory of Climate Change* (New York: Oxford University Press, 2008), pp. 229–30. Peter Singer also defends a history-insensitive view. However, unlike Vanderheiden, his reasoning on this point is entirely pragmatic. His thought is that setting aside historic emissions would help to secure an international consensus based on a commitment to equal per capita emissions: Singer, *One World: The Ethics of Globalization* (New Haven, Conn.: Yale University Press, 2002), pp. 43–44.

13. See, e.g., Eric Neumayer, “In Defence of Historical Accountability for Greenhouse Gas Emissions,” *Ecological Economics* 33 (2000): 185–92, esp. p. 186.

14. Meyer, *Contraction and Convergence*, pp. 62–63.

by a principle of equality. However, that shared commitment permits a variety of different positions when it comes to the three issues identified above.

In what follows, I shall criticize the principle at the heart of all of these versions of the equal per capita view. I should perhaps add that though I am criticizing the claim that emissions should be distributed in an egalitarian fashion, I am not criticizing equality in itself (either as a global or as a domestic ideal). In fact, I endorse an egalitarian account of global and domestic distributive justice. I object here to the application of equality to this one particular item.

To begin our inquiry, let us first consider what reasons can be adduced in favor of the equal per capita view.

III. ARGUING FOR THE EQUAL PER CAPITA VIEW

We can distinguish between two kinds of argument for the equal per capita view. Some appeal to a nonegalitarian theory of distributive justice and argue that it requires greenhouse gas egalitarianism; others appeal to an egalitarian theory of distributive justice.¹⁵

A. Argument 1: A Sufficiency Argument

Let us consider the nonegalitarian route first. I believe that the only nonegalitarian argument for greenhouse gas egalitarianism that has *any* promise at all for defending the equal per capita view starts from the assumption that justice requires that people attain a certain threshold standard of living.¹⁶ Such a sufficientarian approach would clearly have implications for the distribution of greenhouse gas emissions. Persons need fuel to heat themselves and to cook food. They need to live in houses (which have historically been a high source of greenhouse gas emissions). They frequently need transportation and to

15. See Charles Beitz's distinction between "direct" and "derivative" reasons for equality in Beitz, "Does Global Inequality Matter?" *Metaphilosophy* 32 (2001): 97ff.

16. For an important statement of a sufficientarian approach, see Harry Frankfurt, "Equality as a Moral Ideal," *Ethics* 98 (1987): 21–43.

enjoy goods that require transportation. There is no doubt, then, that a sufficientarian view would have implications for the distribution of greenhouse gas emissions.¹⁷

Would it, however, require equality of emissions rights? The argument would have to run as follows:

- (P1) Justice requires that each person enjoy a certain threshold standard of living, including (at the very least) that basic needs are met.
- (P2) People have equal basic needs in the use of greenhouse gas emissions.

Therefore,

There should be equal emission rights.

One challenge to this argument would be that the argument is invalid because even if (P1) and (P2) were correct, such a sufficientarian position would tolerate inequalities of any emissions left over once the sufficientarian threshold has been attained.

However, it might be argued in response to this that although this is true in principle, in practice meeting the sufficiency level would actually use up all the emissions available, so there would be no remainder that could be distributed unequally. Whether this is so will depend on whether a number of different conditions obtain. More precisely, it would depend on (at least) three variables: (i) how high one sets the “sufficiency” standard, (ii) the extent to which attaining the specified standard of living requires emitting greenhouse gases (for example, through the use of fossil fuels rather than other energy sources), and (iii) how much greenhouse gas emissions may permissibly be emitted before triggering dangerous climate change. *If*, for example, one adopts a high sufficientarian standard (variable [i]), and *if* there are not many appropriate alternative energy sources (variable [ii]), *then* it may indeed be true that, given the amount of greenhouse gases that can be permissibly emitted (variable [iii]), meeting (P1) would use up all the permissible greenhouse gases and would leave no “extra” which could be distributed unequally.¹⁸

17. On this, see Henry Shue’s classic article “Subsistence Emissions and Luxury Emissions,” *Law and Policy* 15 (1993): 39–59.

18. A version of this argument is given in Tim Hayward, “Human Rights versus Emissions Rights: Climate Justice and the Equitable Distribution of Ecological Space,”

Whether this combination of circumstances currently applies is hard to ascertain. However, given current emission levels and the existing state of non-fossil fuel energy sources, it would seem quite possible that this combination will come to pass. However, even if we concede this, the sufficientarian argument for greenhouse gas egalitarianism fails because (P2) is clearly false. People have unequal needs. For example, some have a greater need for fuel to keep them warm. Some have greater need for electricity because they require medical equipment. Others have a greater need for transportation because they are handicapped. If we recognize this, though, we have no reason to accept (P2) and, hence, no reason to accept this argument's case for the equal per capita view.¹⁹

B. Argument 2: Standard Egalitarian Arguments

Given the failure of the sufficientarian argument for the equal per capita view, let us consider arguments that appeal directly to egalitarian theories of justice. Dale Jamieson adopts this kind of approach and grounds his equal per capita view in a direct appeal to global egalitarian ideals.²⁰ In a similar vein, Axel Gosseries invokes "cosmopolitan luck egalitarianism" to defend a version of the equal per capita view.²¹ Might

Ethics and International Affairs 21 (2007): 450, note 22. Hayward is defending equality of what he terms "ecological space" (and *not* equality of greenhouse gas emissions). However, his argument has the same structure as that in the text. He argues that given our times of scarcity, attaining a "sufficient" standard of living would in practice require "equality" of ecological space.

19. There are additional reasons for rejecting (P2). Suppose, for simplicity's sake, that we focus solely on greenhouse gases generated by energy: even if people had equal energy needs, this would require equal emission rights only if (a) there was equal energy efficiency from fossil fuels and (b) there were no other energy sources that could be substituted for fossil fuels. I develop points (a) and (b) and discuss non-energy-related emissions in section VII.

20. Jamieson, "Adaptation, Mitigation, and Justice," p. 231.

21. Gosseries, "Cosmopolitan Luck Egalitarianism and the Greenhouse Effect," in "Global Justice, Global Institutions," ed. Daniel Weinstock, special issue, *Canadian Journal of Philosophy* 31 (2005): 280–81. Gosseries is aware that luck egalitarians tend to value equality of the total package of goods rather than one item, but he argues that applying luck egalitarianism to one specific good like greenhouse gas emissions (what, following Jon Elster, he terms a "local" approach [pp. 282–83]) can be justified on "methodological" and practical grounds (p. 283). See Elster, *Local Justice: How Institutions Allocate Scarce Goods and Necessary Burdens* (New York: Russell Sage Foundation, 1992). For discussion of Gosseries on this methodological point, see Caney, "Climate Change, Energy Rights, and

these provide a more compelling argument? In what follows, I shall consider three distinct kinds of egalitarian arguments for the equal per capita view. None, so I claim, is persuasive.

Let us start by considering the leading orthodox egalitarian theories of justice, by which I mean the family of egalitarian theories associated with thinkers like G. A. Cohen and Ronald Dworkin. There is, of course, disagreement between such egalitarian thinkers about what it is that persons should have equal shares of. Well-known candidates include equalizing “welfare” or “resources” or “access to advantage” or “opportunity for welfare” or “capability to function.”²² Given this diversity in the accounts of what should be equalized, I shall simply use the term “goods” throughout the rest of this article as a placeholder to refer to that which should be distributed. The question then is: Can any of these well-known versions of egalitarianism defend the equal per capita view? Should we accept the following?

E: Justice requires equality of “goods,” which, in turn, requires an equal per capita distribution of greenhouse emissions.

A moment’s reflection reveals that (regardless of which equalisandum we accept) none of the standard egalitarian theories would maintain that greenhouse gases should be distributed on an equal per capita basis.²³ For egalitarians believe that the “total package” of goods should be equal:

Equality,” in *The Ethics of Global Climate Change*, ed. Denis G. Arnold (Cambridge: Cambridge University Press, 2011), pp. 92ff. Note also that Gosseries allows some deviations from strict equality (“Cosmopolitan Luck Egalitarianism and the Greenhouse Effect,” pp. 300–304), but equality nonetheless serves as the fundamental moral baseline governing the distribution of the right to emit greenhouse gas emissions.

22. See Ronald Dworkin, *Sovereign Virtue: The Theory and Practice of Equality* (Cambridge, Mass.: Harvard University Press, 2000), pp. 11–64 (“welfare”) and pp. 65–119 (“resources”); G. A. Cohen, “On the Currency of Egalitarian Justice,” *Ethics* 99 (1989): 906–44 (“access to advantage”); Richard Arneson, “Liberalism, Distributive Subjectivism, and Equal Opportunity for Welfare,” *Philosophy & Public Affairs* 19 (1990): 158–94 (“opportunity for welfare”); and Martha C. Nussbaum, *Creating Capabilities: The Human Development Approach* (Cambridge, Mass.: Harvard University Press, 2011); and Amartya Sen, *The Idea of Justice* (London: Allen Lane, 2009), part 3 (“capabilities”). Another option would be to equalize Rawlsian “primary goods.” John Rawls, *A Theory of Justice*, rev. ed. (Oxford: Oxford University Press, 1999), pp. 78–81.

23. I borrow the term “equalisandum” from Cohen, “On the Currency of Egalitarian Justice,” p. 908.

they do not believe that each item should be equalized.²⁴ Thus, a commitment to egalitarianism entails a commitment to equality of welfare (for welfarists) or equality of capabilities (for Sen and Nussbaum). If we start from a commitment to any of these forms of egalitarianism, they do not on their own give us any reason to adopt an “Isolationist view” and to apply equality to one specific good. A shortfall in one good—like the capacity to emit greenhouse gases—can be addressed by a corresponding increase in other goods. Whatever metric of egalitarian justice one chooses, a commitment to egalitarianism will not in principle entail a commitment to equality of greenhouse gas emissions.

This point needs to be qualified in two ways. First, of course, there are limits on the extent to which it is appropriate to lower a person’s share of one good X and increase their enjoyment of another good Y. One might reasonably suppose that for many goods—like food, health, and sleep, to name just some—there is a level below which persons cannot fall if they are to enjoy the other goods. Different goods are not infinitely substitutable. Second, one might also reasonably suppose that the specific combination of different goods should, insofar as it is possible, be sensitive to people’s choices. With these two points duly noted, the point nonetheless remains that standard egalitarian accounts do not require equality of greenhouse gas emissions. Subject to the two constraints specified above, they are compatible with inequalities in greenhouse gas emissions so long as those who have fewer greenhouse gas emission permits than others have more of other goods, and those who have more emission permits than others have fewer other goods.

Conventional egalitarian theories thus provide us with no reason to embrace the equal per capita view.

C. *Argument 3: The “Natural Resources” Argument*

If we turn now to consider two other egalitarian arguments that have been made, we can see that they are vulnerable to a similar objection.

24. For a fuller analysis, see the incisive discussions by Derek Bell, “Carbon Justice? The Case against a Universal Right to Equal Carbon Emissions,” in *Seeking Environmental Justice*, ed. Sarah Wilks (Amsterdam: Rodolphi, 2008), pp. 239–57, esp. p. 250; and David Miller, “Global Justice and Climate Change: How Should Responsibilities Be Distributed?” *Tanner Lectures on Human Values*, March 24–25, 2008, pp. 142–43 <http://www.tannerlectures.utah.edu/lectures/documents/Miller_o8.pdf>. See also Caney, “Justice and the Distribution of Greenhouse Gas Emissions,” *Journal of Global Ethics* 5 (2009): 131.

Some, for example, appeal to a more restricted egalitarianism and hold that there should be equality of *natural resources*. Steve Vanderheiden argues along these lines in his recent book *Atmospheric Justice*.²⁵ In particular, he appeals to Charles Beitz's argument that natural resources are morally arbitrary and hence that parties in Rawls's "international" contract (one in which the contracting parties are representatives of states) would adopt an egalitarian global natural resource principle.²⁶ In doing so, we might note, he is articulating a view that is also affirmed by many left-libertarians.²⁷ Vanderheiden's next claim is to maintain that the natural resource principle entails that greenhouse gases should be distributed on an equal per capita basis.²⁸ Vanderheiden thus affirms:

E*: Justice requires equality of natural resources, which, in turn, requires an equal per capita distribution of greenhouse emissions.

Prior to evaluating E*, we should, however, note that sometimes Vanderheiden (and others) adduces a different argument.²⁹

D. *Argument 4: The "Global Natural Resources" Argument*

At times Vanderheiden affirms the following:

25. Note Vanderheiden allows some legitimate reasons for inequality. Vanderheiden, *Atmospheric Justice*, pp. 107–8, 225–27, esp. pp. 226 and 249. He describes his view as a "modified equal shares" view and wishes to meet all "subsistence emissions" first before then equalizing the remainder. *Ibid.*, pp. 226, 243–47.

26. See *ibid.*, pp. 101–9, esp. pp. 101–4 and 223–30; and Charles Beitz, *Political Theory and International Relations* (Princeton, N.J.: Princeton University Press, 1999), pp. 136–43.

27. For a collection of leading left-libertarian thinkers, see Peter Vallentyne and Hillel Steiner, eds., *Left-Libertarianism and Its Critics: The Contemporary Debate* (Basingstoke, UK: Palgrave Macmillan, 2001).

28. Vanderheiden, *Atmospheric Justice*, pp. 102, 108–9, and 223–30.

29. One problem with Vanderheiden's argument that I shall not pursue here is simply that he assumes, but does not defend, Beitz's reasoning for a global natural resource principle. This is particularly problematic because Beitz did *not* argue that the natural resource principle should apply in our world. Rather, he argued that there would be a good case for the natural resource principle in a world without extensive interdependence. However, if there is extensive global interdependence, then there should be a single original position; and Beitz, following Rawls's reasoning, maintains that the parties would choose a global Difference Principle and this does not require a global natural resource principle. Beitz, *Political Theory and International Relations*, pp. 143–53. Vanderheiden cannot therefore simply invoke Beitz's theory to vindicate a global natural resource principle unless he shows, *contra* Beitz, that we do *not* live in a highly globalized world.

E**: Justice requires equality of the *natural resources that are part of the global commons*, which, in turn, requires an equal per capita distribution of greenhouse gas emissions.

He writes that some might criticize E* on the grounds that the natural resources contained within states are justly owned by the members of those states.³⁰ He argues, however, that these arguments have no force against the atmosphere because the latter lies outside the boundaries of states: the atmosphere is thus a “common global resource.”³¹ He then appeals to a more restricted kind of egalitarianism—one that calls for equality of those natural resources that are “common global resource[s]”—and holds that this revised kind of egalitarianism entails that greenhouse gases should be distributed on an equal per capita basis.³²

The second and third egalitarian arguments define the equalisandum more restrictively than the first. Nonetheless, a variant of the objection leveled against the first egalitarian argument applies against both of these too. Let us consider the “global natural resources” argument because objections to E** will also tell against E*. Suppose for the sake of argument that we assume that no natural resources contained within states may be included within the pot of natural resources to be distributed globally, and that we focus only on goods that are “common global

30. Vanderheiden, *Atmospheric Justice*, pp. 103–4, 224–25, and 248–49.

31. *Ibid.*, p. 224. It is not clear whether Vanderheiden thinks that these arguments against Beitz’s natural resource principle are persuasive. (In fact, he describes Beitz’s argument for a natural resource principle as “compelling.” *Ibid.*, p. 224.) I think that his aim is rather to avoid this controversy. But this option is not available. The arguments showing that states have unrestricted ownership of the natural resources in their territory must either fail or succeed. If the arguments fail, it is incorrect to say that each person is entitled to an equal per capita share of the atmosphere; Beitz’s natural resources principle should apply, as Beitz intends it to apply, to all natural resources whether they lie within or without the confines of the state. Alternatively, the arguments might succeed. However, for this to be the case, Vanderheiden must supply arguments in their defense (and, even then, they do not vindicate the equal per capita view for the reason given in the text). One cannot sidestep the issue and then conclude that the equal per capita emissions view is correct.

32. See also Darrel Moellendorf’s argument that the “equal per capita [view] . . . is a plausible interpretation of what equality requires with respect to the use of a *common* resource to which no one can claim a natural or preexisting individual entitlement.” Moellendorf, “Treaty Norms and Climate Change Mitigation,” *Ethics and International Affairs* 23 (2009): 257, emphasis added.

resource[s],” to use Vanderheiden’s phrase.³³ Even so, Vanderheiden’s argument does not ground an equal per capita approach to the atmosphere. It would do so only if the use of the atmosphere were the only common global resource. This, however, is clearly mistaken. There are many other natural resources that are plausibly seen as common global resources.³⁴ These include all of the following:

(1) *The resources of the seabeds*: Currently, the United Nations Convention on the Law of the Sea (UNCLOS) grants coastal states rights over the resources in the seabed within a two hundred nautical mile radius from their coast (the “Exclusive Economic Zone”) and its share of the “Continental Shelf” (which is up to two hundred nautical miles from the base of a country’s landmass).³⁵ However, even if we accept this, the remaining area is rich with mineral resources, such as cobalt, copper, manganese, and iron.³⁶ It also includes “deep ocean volcanic vents,” commonly referred to as “black smokers,” which contain highly valued minerals.³⁷ If

33. Vanderheiden, *Atmospheric Justice*, p. 224. For the record, it is not clear to me why we should assume that any argument for “conventional property rights” (p. 103) would show that property owners are entitled to *exclusive* ownership of *all* the value of the natural resources contained within states. It seems to me that we are faced with two competing values. On the one hand, there are the legitimate interests of would-be property owners and the benefits they would enjoy from ownership (value 1). On the other hand, there is Beitz’s powerful argument that “the natural distribution of resources” is, as he puts it, quoting Rawls’s famous phrase, “arbitrary from a moral point of view.” Beitz, *Political Theory and International Relations*, p. 140 (value 2). And this second argument is hard to dismiss as having no weight. Given this, it is far from clear why the former value (value 1) should dominate, and why *no weight whatsoever* should be attributed to the second (value 2). (The same point is made by Henry Sidgwick, who writes that there should be a “compromise” “between the prescriptive rights of the particular State and the general claims of humanity,” in Sidgwick, *The Elements of Politics*, 4th ed. [London: Macmillan, 1919], chap. 15, sec. 4, p. 255.) If this is right, then humanity as a whole may have *some* claim on the natural resources contained within states. And if *this* is right, then the global natural resource principle should include within its remit at least *some* part of those natural resources that lie within the borders of states.

34. Cf. Bell, who makes the same point in a critique of Lockean arguments for greenhouse gas egalitarianism. Bell, “Carbon Justice?” p. 252.

35. See the *United Nations Convention on the Law of the Sea* (1994), parts 5 and 6.

36. See Susan J. Buck, *The Global Commons: An Introduction* (Washington, D.C.: Island Press, 1998), p. 90 and, more generally, pp. 88–91.

37. See David Freestone and Salman M. A. Salman, “Ocean and Freshwater Resources,” in *The Oxford Handbook of International Environmental Law*, ed. Daniel Bodansky, Jutta Brunnée, and Ellen Hey (Oxford: Oxford University Press, 2007), p. 341.

we then include resources contained within the Exclusive Economic Zone and the Continental Shelf, then we should also add considerable reserves of oil and gas into the global commons.

(2) *The absorptive capacity of the oceans*: An additional global resource arises from the fact that the oceans, like the atmosphere, are able to absorb some pollution. For this reason the Commission for Global Governance proposed “fees (or auctions of licenses) for maritime dumping of waste where the level of toxicity does not require outright prohibition.”³⁸ If the oceans are part of a global commons, then any revenue raised from such schemes should be treated as a commonly held resource.

(3) *The fish stock*: Oceans, of course, contain large numbers of fish stock that roam the world’s oceans and so can be seen as part of the global commons.

(4) *The Arctic and Antarctic*: These both include natural resources. Antarctica, for example, contains copper, gold, iron, silver, and petroleum.³⁹

(5) *Geostationary orbits*: Geostationary orbits refer to orbit paths around the Earth that can be used by satellites. These orbits are essential for television and weather satellites, and thus constitute another valuable global common resource.⁴⁰

(6) *The use of the electromagnetic spectrum*.⁴¹

(7) *The atmosphere’s capacity to absorb CFCs*: The atmosphere can absorb the emission of CFCs (with, of course, an upper limit to ensure that the ozone layer is not depleted). The capacity of the atmosphere to absorb a certain amount of CFCs should therefore also count as a global resource.⁴²

38. Commission for Global Governance, *Our Global Neighbourhood* (Oxford: Oxford University Press, 1995), p. 220.

39. See the instructive discussion in Thomas M. Franck, *Fairness in International Law and Institutions* (Oxford: Clarendon Press, 1995), pp. 401–5.

40. See Buck, *The Global Commons*, p. 158; cf. pp. 157ff. and Franck, *Fairness in International Law and Institutions*, p. 401. See also the proposal to charge for permits to use geostationary satellites in Commission for Global Governance, *Our Global Neighbourhood*, p. 221.

41. See Commission for Global Governance, *Our Global Neighbourhood*, p. 221.

42. My list of resources in the global commons is indebted to Susan Buck’s very comprehensive analysis in Buck, *The Global Commons*. See also Oscar Schachter’s pioneering work *Sharing the World’s Resources* (New York: Columbia University Press, 1977), esp. part 2.

Finally,

(8) *The atmosphere's capacity to absorb greenhouse gas emissions.*

The fact that there are so many different goods that can plausibly be said to be included under the heading of the “global commons” undermines Vanderheiden’s argument. For one cannot argue, as he seeks to, that since there should be global equality of commonly owned natural resources, there should therefore be global equality of greenhouse gas emissions (item 8). Someone who is committed to equality of commonly held natural resources should embrace a principle granting everyone an equal share of the total value of all these global resources combined. We have been given no reason to treat item (8) on its own.

IV. A GENERAL CHALLENGE TO THE EQUAL PER CAPITA VIEW

None of the four arguments considered—sufficientarianism, standard egalitarianism, Beitzian natural resource egalitarianism, and modified natural resource egalitarianism—can ground an equal per capita view.

We have also seen, moreover, that many of these arguments fall prey to a common problem: they fail to establish that greenhouse gas emissions should be governed by their own distributive principle. To use the terminology I introduced above, they are unable to show why we should adopt the Method of Isolation, and have a principle of distributive justice that applies solely to the emission of greenhouse gas emissions. Reflection on this suggests a general problem with the equal per capita view. We might state it thus:

First General Challenge: If distributive justice is concerned with the fair share of a “total package” of goods, then we have *no* reason to endorse a principle that applies solely to one particular item, such as greenhouse gas emissions. If this is right then (subject to the two qualifications introduced in section II.B), it does not make sense to refer to *the* fair distribution of greenhouse gases.

In the next two sections, I examine several responses to this General Challenge, each of which seeks to show that it does make sense to construct a principle of distributive justice that applies to greenhouse gases considered in isolation from other advantages and disadvantages.

V. RESPONSE 1—AN APPEAL TO EXCEPTIONS

One response might proceed as follows: “The arguments presented so far, and the General Challenge, assume that principles of justice apply to the total collection of burdens and benefits. However, it is well recognized that there are cases where we do think that some goods should be governed by their own specific principle.” To put it in more formal terms, the critic is rejecting the following analysis of distributive justice:

Model I: Theories of distributive justice are concerned with the fair distribution of an overall package of goods (the wholly Integrationist Approach).

Instead, the critic argues, we should accept the following:

Model II: Theories of distributive justice generally comprise:

- (a) principles that apply to a total package of goods (an Integrationist component), but
- (b) in some well-recognized cases, principles can apply to some specific goods or bads considered in isolation (an Isolationist component).

A version of Model II was once defended by the Nobel Laureate James Tobin. In his suggestive article “On Limiting the Domain of Inequality,” he defends what he calls “specific egalitarianism,” where this maintains that in some cases principles of equality should apply to some specific goods.⁴³

Suppose then, that, for the sake of argument, one accepts Model II. Even if we do so, I think it provides no support for the equal per capita view or the Isolationist approach to greenhouse gases on which it depends.⁴⁴ Let us consider the kinds of exceptions to Integrationism that

43. See James Tobin, “On Limiting the Domain of Inequality,” *Journal of Law and Economics* 13 (1970): 263–77, at p. 264.

44. Some may think Model II is obviously superior to Model I and that the latter should be rejected. This may be too hasty a verdict. One’s position on both theses depends in part on the level of abstraction at which one is operating. Someone may, for example, adopt

(b) would support. Within Tobin's work, one can find three different kinds of reason for distributing some specific goods according to their own distributive principle.

A. The "Equal Rights" Argument

One kind of case where we practice a Method of Isolation and apply a principle of justice to one specific good is the ascription of fundamental civil and political rights. When thinking about certain rights—such as the right to free speech or the right to freedom of conscience—we do not think in an Integrationist fashion. We think, for example, that it is impermissible that one citizen might have fewer rights to vote than a fellow citizen, even if the former has more of other goods (such as more money).⁴⁵ Rights, on this view, are a nonsubstitutable good and should therefore be treated in Isolation. They express our equal moral dignity and, as such, cannot be traded off against other goods.

what could be termed a "two-level" view. This makes two claims. (i) At the most fundamental level, justice requires the fair distribution of a value (for example, welfare) according to a single principle. However, (ii) the fair distribution of this basic value (in this case, welfare) may require that some particular resources and opportunities that contribute to welfare should be distributed in very specific ways. The second claim maintains that there are certain resources or opportunities of which it is the case that unless one distributes them in particular ways, the ultimate fundamental value cannot be attained.

To make this more concrete, imagine a theory that is, at the fundamental level, committed to maximin welfare. Now suppose, as seems reasonable to suppose, that for people to enjoy the level of welfare required by the principle of maximin welfare, it must be the case that everyone enjoys what Rawls terms "the social bases of self-respect." Rawls, *Justice as Fairness: A Restatement*, ed. Erin Kelly (Cambridge, Mass.: Harvard University Press, 2001), p. 59. And suppose, finally, that to provide the social bases of self-respect for all requires that civil and political rights be distributed equally. In such a case, it is true both (a) that at the most fundamental level justice requires distributing a good according to a single principle (in line with Model I) and yet, (b) at a more concrete level, to honor this fundamental principle in fact requires treating some different particular goods according to different particular principles (in line with Model II). I am grateful to Nils Holtug for instructive discussion.

45. Tobin reasons in this way about the right to vote. Tobin, "On Limiting the Domain of Inequality," pp. 266 and 269. He also gives other examples where one might think that everyone has an equal entitlement to some specific good (such as the right to have children) or should be subject to the same responsibility (such as conscription). *Ibid.*, pp. 266 and 269–71.

However, I can see no reason why this kind of argument would support greenhouse gas egalitarianism. Persons' civil rights and the right to vote have an important symbolic and expressive status: they are taken to constitute persons' equal status as citizens. This is why it is wrong to distribute these unequally. However, while these rights have a special symbolic significance, many other goods (being able to go on holiday, buy meals in high-quality restaurants, afford a larger house) do not, and the ability to emit greenhouse gas emissions surely falls into this second category.

B. The "Paternalist" Argument

Consider now a second rationale for "specific egalitarianism." Tobin argues that in some cases we adopt a specific egalitarian approach for "paternalist" reasons.⁴⁶ He reasons as follows: there are some cases where we think that it is important not simply that people have a fair total package of goods but also that they have certain particular goods. However, we cannot trust each person to ensure that they have enough of these particular goods. If we did trust them, then we could distribute them with a fair total package of goods, but if we do not think they would choose wisely and if we think it is essential to have a certain amount of a good X, then justice requires treating this particular good, X, in isolation. Tobin illustrates his argument with the example of food stamps.⁴⁷ If it is important that everyone have enough food, then rather than simply distribute money, which would enable them to buy food (but also other things instead), one might distribute some resources in an "in-kind" form.

C. The "Unreliable Trustee" Argument

Prior to evaluating the relevance of this consideration, we should, however, note an ambiguity in Tobin's discussion. Under the heading of "paternalism," he discusses another kind of case which is not accurately described as paternalism but could nonetheless provide a ground for

46. See *ibid.*, p. 266.

47. *Ibid.*, pp. 274–75.

treating some goods on their own and in Isolation.⁴⁸ The case he raises is as follows: Suppose that some agents act as “trustees” for the rights and interests of others. States, for example, could be said to act as trustees for their citizens or subjects, and parents are often required to act as trustees for their children. Now, in any system that distributes resources to trustees with the aim that they administer the resources to those in their care, one might wish to take steps to ensure that the trustee really does serve the interests of those in their care and does not simply abuse their position.⁴⁹ With this in mind, one might then adopt a “specific egalitarian” approach. To give the example of parents: rather than simply giving money to the parents, one might give vouchers that can only be spent on children in certain specified ways.⁵⁰ Thus, where one has a system of trustees who might not discharge their duties appropriately, one has reason to distribute certain specific goods separately and on their own.

Do either the “paternalist” or the “unreliable trustee” arguments support treating the distribution of permits to emit greenhouse gases in isolation? I do not think so.

The paternalist argument faces a number of formidable problems. First, of course, is the question of why we should adopt a paternalist position with respect to greenhouse gas emissions. Second, even if one wished to adopt a paternalist position, surely one’s concern would be to ensure that people enjoy a certain level of energy, for example, but this is *not* the same as ensuring a certain level of greenhouse gas emissions. One could distribute energy in an “in-kind” form without distributing greenhouse gas emissions. One might, for example, distribute solar panels to some or assist the construction of a hydroelectric dam or help build wind

48. *Ibid.*, p. 268.

49. See Shue’s defense of an emissions regime in which some of the legal rights to emit greenhouse gases are inalienable for precisely this reason: Henry Shue, “Climate,” in *A Companion to Environmental Philosophy*, ed. Dale Jamieson (Oxford: Blackwell, 2001), pp. 455–56; and Shue, “Subsistence Emissions and Luxury Emissions,” p. 58. Note: Shue does not appeal to this consideration to argue that greenhouse gases are subject to their own specific principle of distributive justice.

50. Tobin thus defends allocating nontradable food rations to families on the grounds that “no family should bargain away its children’s vitamins even if the parents want to do so.” Tobin, “On Limiting the Domain of Inequality,” p. 268. See also his discussion of educational vouchers in *ibid.*, p. 271.

farms. So we have no reason to single out greenhouse gases for special treatment. (This point is developed more fully in section VII.)⁵¹

Note, too, that the last point also undermines any attempt to apply the unreliable trustee argument to show that greenhouse gas emissions should be distributed according to their own specific principle. Distributing energy sources in an “in-kind” way to avoid abuse by unreliable trustees does *not* require distributing emission rights on their own.

More importantly, the “unreliable trustee” argument is best understood as an argument about effective policy design rather than an argument about the nature of justice. While it might be a good idea when designing and implementing policy instruments to treat some goods in isolation—to prevent abuse by improperly motivated trustees—this is not the right kind of argument to show that, at the level of fundamental moral theory, some goods are governed by their own specific principle of justice. Someone who adheres to an Integrationist theory of justice can, for example, also employ the sort of “in-kind” policy instrument that Tobin has in mind. Distributing goods in the form of vouchers is a technique for increasing the probability that goods get to be enjoyed by the intended beneficiaries: it is not a philosophical thesis to the effect that some goods should be governed by their own specific distributive principle.

I have considered three possible reasons for treating some goods in isolation: “equal rights,” “paternalism,” and “unreliable trustees.” None of them gives us reason to devise a specific principle of justice for the emission of greenhouse gases. A commitment to Model II, thus, does not undermine my contention that there is no reason to treat greenhouse gases in isolation.

51. This is an extremely important point. See the illuminating analysis in Henry Shue, “Avoidable Necessity: Global Warming, International Fairness, and Alternative Energy,” in *Theory and Practice: NOMOS XXXVII*, ed. Ian Shapiro and Judith Wagner deCew (New York: New York University Press, 1995), esp. pp. 251, 254, 256–57, and 259. Shue brings out the way in which access to fossil fuels is “necessary” for many if they are to enjoy a decent standard of living, but also that this is so only given that modern societies have chosen to adopt fossil-fuel-intensive forms of energy and have not invested in other kinds of energy (and so is “avoidable”). This argument is also developed in Hayward, “Human Rights versus Emissions Rights,” esp. pp. 432 and 440–41.

VI. RESPONSE 2—FROM PRACTICALITY TO ISOLATION?

Let us consider now a second attempt to rebut the First General Challenge. Some may dispute it, not by defending some alternative conception of justice (like Model II), but rather by invoking some wholly pragmatic reasons for dealing with greenhouse gas emissions on their own.⁵² These, they might argue, justify the Isolationism on which the equal per capita view depends. Consider in this light two pragmatic arguments.

A. The “Intractability” Argument

First, it might be argued that there is so much disagreement about what constitutes global justice that considering greenhouse gas emissions in conjunction with debates about fair trade, development, poverty, and so on would result in an impasse. There is very deep disagreement about these other matters. So to hold that the distribution of greenhouse gases should be considered in light of a general theory of global distributive justice, it might be argued, would preclude getting anything done. It would be a recipe for deadlock. For this reason we should treat climatic responsibilities in general (and greenhouse gases in particular) in Isolation.⁵³

Of course, one response to this would be simply to say that my argument is a claim about what is, *in principle*, a fair distribution of rights to emit greenhouse gases, and that when understood as such, the real-world considerations about whether such an approach would hinder agreement or not are just not germane. Seen from this vantage point, all that the Intractability Argument can show, at most, is *not* that distributive justice is not Integrationist in nature, but rather that it can be counterproductive to act on the basis that it is Integrationist.

52. In a longer draft of this article, I consider a further (principled) response to the First General Challenge that argues that, contra to both Models I and II, distributive justice comprises a plurality of separate principles, each of which applies to a specific domain of human life. I argue that even this view (inspired by the work of Michael Walzer) would not support treating greenhouse gases in isolation. The longer draft is available from the author.

53. For a clear statement of this argument, see Lukas Meyer and Dominic Roser, “Distributive Justice and Climate Change: The Allocation of Emission Rights,” *Analyse und Kritik* 28 (2006): 239. For a related though distinct point, see also Gosseries, “Cosmopolitan Luck Egalitarianism,” p. 283.

I think that this response is correct. However, I wish to go further and to dispute the assumption that avoiding deadlock requires us to embrace an Isolationist approach. This assumption is questionable for two reasons. To see the first, it is helpful to distinguish between a Maximal and a Minimal theory of global justice.⁵⁴ A person's Maximal theory of global distributive justice, as I am defining it, is their account of the perfect ideal. A Minimal theory of global distributive justice, by contrast, seeks to identify what is absolutely essential. Their moral minimum specifies a moral redline that simply may not be crossed. To give an example, someone might endorse an egalitarian conception of global distributive justice as a Maximal ideal. However, they might also think that for both principled reasons (others reasonably disagree with their account of Maximal justice and it is wrong to impose it on them) and pragmatic reasons (it is unlikely that they can succeed in realizing their ideal in the near future), they have reason to identify a Minimal conception of global justice where this specifies a moral minimum that may never be compromised.

Now with this in mind, one might respond to the Intractability Argument that it may give climate negotiators reason not to invoke their Maximal accounts of global distributive justice. If they seek to realize their Maximal ideals of global distributive justice, then this is likely to result in deadlock. This, however, does not give us reason to embrace Isolationism and eschew Integrationism, for one may examine the distribution of greenhouse gas emissions in conjunction with more Minimal accounts of global justice, and these are much more conducive to reaching international agreement. An Integrationist approach is not, then, in itself prone to generating irresolvable disagreement, and by pursuing a more Minimal ideal of justice, one can address the concern raised by the objection.

A second serious problem with the Intractability Argument is that pursuing a wholly Isolationist approach is also extremely likely to generate intractable disputes. Developing countries, in particular the so-called BASIC bloc (which comprises Brazil, South Africa, India, and China), are deeply opposed to an Isolationist approach. They argue that an equitable distribution of greenhouse gas emissions must take into

54. For a related but slightly different usage of these terms, see Rainer Forst, "Towards a Critical Theory of Transnational Justice," *Metaphilosophy* 32 (2001): 160–79.

account different countries' needs. This is reflected in the United Nations Framework Convention on Climate Change, which refers in its Preamble to "taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty."⁵⁵ These commitments have all been reiterated in all subsequent Conference of the Parties negotiations.⁵⁶ To pursue a wholly Isolationist method would thus run contrary to the UNFCCC and would not secure the agreement of developing countries.

China's position is of especial importance here. China has made clear that its priority is to meet its development needs.⁵⁷ This would not matter if China's participation in a climate agreement were not essential, but China is now the world's largest emitter and is responsible for 24 percent of global CO₂ emissions per annum.⁵⁸ An Isolationist approach is thus likely to result in either deadlock (for China will not agree to emissions reductions) or an ineffective deal that does not include the world's largest emitter.

My conclusion is fully in line with the literature on negotiation analysis, where it is widely recognized by leading experts in the field, such as Scott Barrett, Howard Raiffa, and James K. Sebenius, that focusing on one issue in isolation can be a recipe for deadlock, and that "linkages" can facilitate agreement.⁵⁹ Moreover, linking environmental issues with

55. United Nations Framework Convention on Climate Change (1992), Preamble; cf. Article 3.4 <<http://unfccc.int/resource/docs/convkp/conveng.pdf>>.

56. See, e.g., the agreement at the 2011 COP negotiations, which affirms a commitment to "equitable access to sustainable development" in "I. A shared vision for long-term cooperative action" of "Decision 2/CP.17. Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention," in *Report of the Conference of the Parties on its seventeenth session, held in Durban from 28 November to 11 December 2011*, FCCC/CP/2011/9/Add.1 <<http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf>>.

57. See Paul G. Harris, "China and Climate Change: From Copenhagen to Cancun," *Environmental Law Reporter, News and Analysis* 40 (2010): 10858–63.

58. See Netherlands Environmental Assessment Agency, "Global CO₂ Emissions: Increase Continued in 2007" (published in 2008) <<http://www.pbl.nl/en/publications/2008/GlobalCO2emissionsthrough2007>>.

59. See Scott Barrett, *Environment and Statecraft: The Strategy of Environmental Treaty-Making* (Oxford: Oxford University Press, 2003), chaps. 12 and 13; Howard Raiffa, *The Art and Science of Negotiation: How to Resolve Conflicts and Get the Best out of Bargaining* (Cambridge, Mass.: Harvard University Press, 1982), pp. 13, 183, and 285–87; and the very influential treatment in James K. Sebenius, "Negotiation Arithmetic: Adding and Subtracting Issues and Parties," *International Organization* 37 (1983): esp. 292–300.

other issues is a common practice in negotiations for environmental treaties. To take the case of the treaties preventing the destruction of the ozone layer, Richard Benedick argues that agreement was possible only because the parties linked the distribution of CFCs with two other “goods” (the transfer of substitute technologies and financial assistance to developing countries) and with one “bad” (the threat of trade restrictions).⁶⁰ In addition to this, the importance of “linkages” in furthering climate policy has also been acknowledged in the political science literature on climate negotiations.⁶¹

I am not claiming either that linkages always facilitate agreement (they do not) or that they always serve the cause of justice (again, they do not). I am, though, arguing that isolating the distribution of greenhouse gas emissions from other issues does not necessarily facilitate agreement and will, in fact, prevent an international climate agreement *that reduces emissions* because at least one major player (China and perhaps also India) will not reduce emissions unless its developmental imperatives are borne in mind. The first pragmatic defense of Isolationism therefore fails.

B. The “Impotence” Argument

Let us turn therefore to a second pragmatic argument. It might be argued that it is best to treat greenhouse gas distributions in isolation from other considerations (like poverty or trade) because this best corresponds to the current institutional division of labor at the global level. Currently, decision making for various issues is dispersed. Thus, there are the meetings of the Conference of the Parties (COP), which are designed to reach global climate agreements; there is the World Trade Organization to address global trade; there is the International Labor Organization to address issues surrounding labor rights; there is the United Nations to

60. See Richard Elliot Benedick, *Ozone Diplomacy: New Directions in Safeguarding the Planet*, enlarged ed. (Cambridge, Mass.: Harvard University Press, 1998), pp. 29, 54, 124–26, 152–61, 183–89, 242–44.

61. See Harro van Asselt, Joyeeta Gupta, and Frank Biermann, “Advancing the Climate Agenda: Exploiting Material and Institutional Linkages to Develop a Menu of Policy Options,” *Review of European Community & International Environmental Law* 14 (2005): 255–64; and Onno Kuik, Jeroen Aerts, Frans Berkhout, Frank Bierman, Jos Bruggink, Joyeeta Gupta, and Richard S. J. Tol, “Post-2012 Climate Policy Dilemmas: A Review of Proposals,” *Climate Policy* 8 (2008): 317–36.

deal with issues of violent conflict; and so on. It might be argued that COP negotiators, on their own, are not able to address other issues and so should focus solely on securing a fair share of climatic responsibilities.

There are three problems with this argument. First, on an empirical level, the statement that all that is up for discussion at climate negotiations are emissions rights is false. For example, COP meetings also distribute money. At the most recent COP negotiations, developed countries pledged \$100 billion per annum.⁶² In addition to this, a staple feature of climate negotiations is a commitment to transferring clean technology, the rationale for this being, in part, to enable development in ways that minimize the emission of greenhouse gases.⁶³ Related to this, the Clean Development Mechanism (CDM) further illustrates the way in which the distribution of “emission rights” has become intertwined with the distribution of other goods (like capital and finances), for the CDM enables Annex I countries to gain emissions credits (permits to emit greenhouse gases) by transferring resources and technology that reduce emissions in developing countries below what they would have otherwise emitted (that is, below a “Business as Usual” baseline). The CDM thus allows some to purchase emissions permits for the exchange of other goods (like money and capital).⁶⁴ To push this point one step further, one might argue that if what is distributed at climate negotiations are permits to emit greenhouse gases, which can be bought and sold for money, then the COP negotiations are, in effect, simply distributing money.⁶⁵ For all these reasons, then, the supposition that climate negotiators are only able to affect the distribution of greenhouse gas emissions is inaccurate.

62. Preamble to the section on “Longterm Finance” in “Decision 2/CP.17.”

63. See, e.g., Article 4.1(c), Article 4.3, and Article 4.5 of the UNFCCC (1992) <<http://unfccc.int/resource/docs/convkp/conveng.pdf>>; Article 2.1(a)(iv), Article 10(c), and Article 11.2(b) of the Kyoto Protocol (1997) <<http://unfccc.int/resource/docs/convkp/kpeng.pdf>>; and Section V, “Technology Development and Transfer,” of “Decision 2/CP.17,” which was agreed on at the 2011 COP negotiations.

64. Another climate policy instrument that equates emissions with money is the UN’s Reducing Emissions from Deforestation and Forest Degradation. See <<http://www.un-redd.org/>>.

65. John Broome and Andrew Williams both, independently, pointed out to me that if the entire “greenhouse gas budget” were distributed in the form of tradable permits to emit greenhouse gases, then this alone would be sufficient to undermine Isolationism. Such a scheme would in effect be distributing money, but if what is being distributed is money,

Second, even if it were true that climate negotiators were only able to distribute one good (permits to emit greenhouse gases), this is insufficient to vindicate Isolationism. Suppose we assume for the sake of argument that climate negotiators lack the power to affect the distribution of other goods. This alone would not prevent them from *taking the distribution of other goods into account* when deciding how to distribute emission permits, and this is all that is necessary to open up the possibility of their acting in an Integrationist manner. Climate negotiators can, for example, allocate a large share to the extremely disadvantaged on the grounds that they can sell some of these and then use the money generated to meet health or educational needs. It is thus perfectly possible for negotiators to distribute emission rights in an Integrationist fashion (bearing in mind whether it impedes or helps realize the eradication of poverty, say, or more generally whether it helps realize the Millennium Development Goals). In short: it is a fallacy to assume that just because (1) an agent A is only able to affect the distribution of one particular good, then (2), A is unable to distribute that good in ways that take into account the distribution of other goods.

Finally, even if this argument did apply at the global level, it has very little force when we consider the domestic policy of states. Since there is no analogous fragmentation of different policy-making processes within states, governments can, at the domestic level, make decisions about the fair distribution of greenhouse gas emissions in conjunction with decisions about poverty, education, health, and so on.

None of the pragmatic responses to the First General Challenge succeeds.

then there is no reason to distribute these permits according to their own sui generis criterion: their distribution should simply be a function of the principle that one thinks should govern the distribution of all money. I think that this is right and provides an additional reason to reject Isolationism. However, its key premise (that all rights to emit should be tradable) is a contentious one, and many criticisms have been made of emissions trading schemes (including some drawing on the arguments made by Tobin that have been discussed in this article). My view is that these objections to emissions trading are unpersuasive, but I do not have the space to defend that here. See Caney and Hepburn, "Emissions Trading." My verdict, then, is that this provides an additional reason as to why Isolationism is misplaced that can complement the ones I present in the text.

VII. A SECOND GENERAL CHALLENGE—PUTTING EMISSIONS IN THEIR PLACE

Thus far we have reached two conclusions. First, there is no good argument for the equal per capita view (section III). Second, and more radically, what I have termed the First General Challenge reveals that there is no good reason to adopt a Method of Isolation for greenhouse gas emissions (sections IV–VI). I now wish to introduce a Second General Challenge to the equal per capita view, and indeed to any view that treats greenhouse gases in isolation.

To introduce this second challenge, it is necessary to introduce a distinction between two kinds of substitutability, what I shall term “Wide Substitutability” and “Narrow Substitutability.” Wide Substitutability occurs when one substitutes one kind of good with another quite different kind of good without detriment to that person because their overall share of goods remains just.⁶⁶ To illustrate this concept, suppose that one uses a resourcist metric. Suppose, moreover, that one thinks that persons are entitled to a certain level of resources. And suppose, finally, that there are two different types of resources. From the point of view of realizing this ideal of distributive justice, it may be the case that the loss of one kind of resource can be made up by the provision of another, quite different kind of resource.⁶⁷ Where this occurs, one can say that the different kinds of resources can, in these cases, be substituted in a wide sense. See Figure 1 for a diagrammatic representation of this.

Now the First General Challenge that I raised in section IV, and defended against two challenges, appeals to the concept of Wide Substitutability, for it exploits the possibility of some having fewer permits to emit greenhouse gases so long as they have a correspondingly greater share of other goods.

Consider now what I shall term “Narrow Substitutability.” X and Y are substitutes in the narrow sense when X and Y both possess *the same kind of properties*: for example, they produce the same specific kind of

66. Recall that I use the term “goods” to refer to “that which people should have fair shares of.” It may be “resources” or “capabilities” and so on, depending on what metric of justice we adopt.

67. Though see the two provisos introduced in section III.B, which stipulate that (i) for some goods there are minimum thresholds below which one should not fall if one is to enjoy a decent life and that (ii) we should strive to make the combination of goods as responsive as possible to people’s choices.

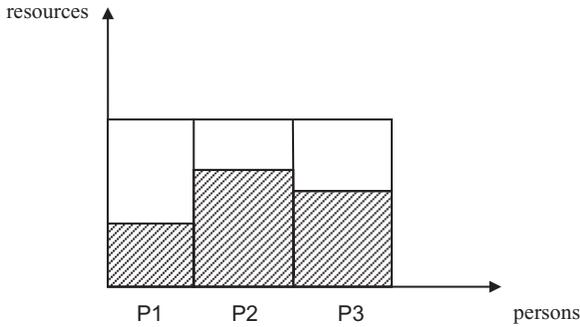


FIGURE 1.

Note: The lined space indicates the amount of one “resource,” for example, the volume of greenhouse gases one is entitled to emit (or sell to others). The blank space indicates the amount of a second “resource” (or set of “resources”). Note that *nothing* depends on my employing a resourcist account of the goods to be distributed here. The point could be illustrated using other metrics, such as, say, welfarism or the capabilities approach or some other account of what I am terming the “goods” that are the subject of an account of distributive justice.

benefit (and have the same kinds of disadvantages) and thus can be used interchangeably to achieve that benefit.⁶⁸ We often think of substitutability in this narrow sense. For example, we may treat traveling by equally cheap, equally comfortable, equally frequent bus and train transportation as kinds of Narrow Substitutability.⁶⁹

68. This approach is close to Kelvin Lancaster’s seminal analysis in “A New Approach to Consumer Theory,” *Journal of Political Economy* 74 (1966): 132–57, esp. pp. 132–33.

69. My distinction here is indebted to both Robert Goodin’s analysis of “compensation” and the account of “substitutability” given by John O’Neill, Alan Holland, and Andrew Light. Goodin distinguishes between what he terms “means replacing” and “ends-displacing” compensation. He writes of “means replacing” compensation that “the idea here is to provide people with equivalent means for pursuing the *same* ends”: Goodin, “Theories of Compensation,” *Oxford Journal of Legal Studies* 9 (1989): 60. In the case of “ends-displacing compensation,” by contrast, “the idea here is to compensate people, not by helping them pursue the same ends in some other ways, but rather by helping them to pursue some other ends in a way that leaves them subjectively as well off overall as they would have been had they not suffered the loss at all”: *ibid.* A similar distinction is invoked by O’Neill, Holland, and Light, who distinguish between “technical substitutability” and “economic substitutability,” using the former to refer to Goodin’s “means replacing” compensation and the latter to refer to Goodin’s “ends-displacing” compensation: Goodin, *Environmental Values* (London: Routledge, 2008), pp. 189ff.

I have introduced the concept of Narrow Substitutability to address a potential limitation in my defense of the First General Challenge. Someone might argue that there are limits to the extent to which we can substitute (in a wide sense) rights to emit greenhouse gases. As I observed, for many goods (sleep, food, water) there is a lower limit (the Sufficiency Constraint) beneath which we cannot function. Hence, though we can substitute different goods for one another, that does not apply below a certain threshold. Drawing on this, someone might argue that this applies to rights to emit greenhouse gases, because these are necessary for certain essential activities like cooking, heating, agriculture, and protection against the elements.

In what follows, I want to address this, and to present a Second General Challenge to the equal per capita view and the Isolationist assumptions on which it depends. This challenge can be stated as follows:

Second General Challenge: The equal per capita view's focus on distributing permits to emit greenhouse gases is inappropriate because these permits are substitutable in a narrow sense. The specific goods that are associated with permits to emit greenhouse gases can be provided in other ways. Since this is so, it is a mistake to claim that there is a principle of justice governing the distribution of rights to emit greenhouse gases (including a principle stipulating a threshold level of emissions that each person needs).⁷⁰

My distinction between Wide and Narrow Substitutability broadly corresponds to the ends-displacing/economic versus means replacing/technical distinction. However, there is one crucial difference—namely, that Wide Substitutability is *not* necessarily defined in welfarist terms (unlike the concepts of “ends-displacing compensation” and “economic substitutability,” which are framed in explicitly welfarist terms). By contrast with them, Wide Substitutability is not committed to any particular metric of justice. It just refers to cases where one person's lack of one kind of “good” is made up by the provision of another kind of “good” so that they are equally well off *however we define “well off” and the “goods” employed to make such an assessment*. See note 24.

70. Tim Hayward makes a similar point in his instructive discussion of subsistence emissions, writing that “it is the ends of subsistence that are significant for human rights, not the emissions rights that may contingently (but not always necessarily or without qualification) be a suitable means for promoting those rights.” Hayward, “Human Rights versus Emissions Rights,” p. 441. Hayward provides a powerful statement of a broadly Integrationist approach as I am defining that term (esp. pp. 432, 437, 440–43, and 445–46). He affirms a right to “secure access to the means of a decent life” (p. 432: cf. pp. 433, 440–44) and then argues that emissions matter only insofar as they further that right (compatible with honoring other rights) (p. 443).

To illustrate my claim and to advance my Second General Challenge, consider now three ways in which greenhouse gases are substitutable in a narrow sense.

(1) *Energy Efficiency*: The first appeals to improvements in energy efficiency. We value having the ability to emit greenhouse gases, in part, because they enable us to engage in energy-intensive activities. Now suppose that A and B have unequal emission rights. A can emit, say, 1 metric ton of carbon dioxide equivalent whereas B can emit only 0.75 metric tons. Suppose further that the state can improve B's energy efficiency such that B could get the same amount of energy with his allocation of 0.75 metric tons as he could if he had 1 metric ton of carbon

While I agree with the general thrust of Hayward's analysis, I disagree with several aspects he is keen to emphasize. First, I am unconvinced by his suggestion that we should distribute equal "ecological space" (p. 433; cf. pp. 445–48), where that is defined as "the planet's aggregate natural resources and environmental services that are available on a sustainable basis for human use" (p. 445). Hayward is in effect committed to "equality of external natural resources." As such, his own focus on "ecological space" as an equalisandum (pp. 447–48) jars with his view that what really matters is that persons have the equal opportunity to live "a decent life." Two people may enjoy equal ecological space (that is, equal "natural resources and environmental services") but an unequal opportunity to lead "a decent life" (because, say, one is more talented at using natural resources or because one suffers from worse health). Put otherwise: anyone committed to equalizing the opportunity to lead a decent life would not seek to equalize command over external natural resources, given that other factors (like talents and whether someone has greater needs) also play a significant role. Hayward's view is vulnerable to the objections of Dworkinian resourcists (who would include natural talents in the metric of justice; Dworkin, *Sovereign Virtue*, chap. 2), and to the objections of those who reject any kind of resourcism and favor "access to advantage" (Cohen, "On the Currency of Egalitarian Justice") or "capability to function" (Sen, *The Idea of Justice*, part 3; and Nussbaum, *Creating Capabilities*). For similar criticisms of the proposal to use "ecological space" as a metric of justice, see the excellent discussion in Ed Page, "Intergenerational Justice of What: Welfare, Resources or Capabilities?" *Environmental Politics* 16 (2007): 461.

Second, and more generally, whereas Hayward endorses a particular distribendum, my Second General Challenge, as I stress below (note 80), is not dependent on any particular account of what should be distributed.

Thirdly, I do not share his hostility to the concept of a right to emit (pp. 435–36, 439–40). To give an example, Hayward maintains that "any right to emissions cannot be supported by appeal to any human rights grounds comparable to those of the right to an adequate environment. There is no human right to pollute" (p. 440). This seems to me implausible. Dangerous climate change matters, in part, because it harms vital interests in life, health, and subsistence. But protecting these very interests can also, in some circumstances, require rights to emit. The right to emit *can* therefore "be supported by appeal to . . . human rights grounds comparable to those of the right to an adequate environment."

dioxide equivalent. Now if one is a greenhouse gas egalitarian, one would have to conclude that this is unfair. But this, it seems to me, is very odd. To all intents and purposes, B is now as well off as A: B has exactly the same opportunities as A does (and that B himself would have if he had had an increase in emissions but no increase in energy efficiency). What this reveals is that we care, in this instance, about specific goods (such as energy), and the possession of greenhouse gas permits has value only insofar as it promotes those specific goods.⁷¹

(2) *Alternative Energy Sources*: This conclusion receives further support if we turn to a second consideration. As noted above, rights to emit greenhouse gases are useful, to a large extent, because they permit the use of fossil fuels to produce energy. However, there are, of course, other energy sources. These include solar thermal energy, solar photovoltaics, tidal, wave, hydroelectricity, wind, geothermal, biofuels, and nuclear energy. Even if these cannot currently replace fossil fuels entirely, they can play a significant role, and this is all that is needed for my argument. To give an example, biodiesel (a fuel that can be made from palm oil, soybean, rapeseed oil, and jatropha) and bioethanol (a fuel that can be made from maize/corn, sugar beet, and sugar cane) can be mixed with diesel and petrol, respectively, up to a 5 percent concentration without necessitating any change to a car's engine and without any loss.⁷² Or to give a second example, new buildings can be constructed that harness thermal energy and therefore consume only half as much gas for low-temperature heating as older housing stock.⁷³ The fact that it is possible to provide alternative energy sources thus entails that people need not have equal emissions if those who have fewer greenhouse gas emissions can have correspondingly more of another comparable energy source.⁷⁴

71. For an example of the kinds of reductions in emissions that can be realized through greater energy efficiency, see *The King Review of Low-Carbon Cars Part I: The Potential for CO₂ Reduction* (London: HM Treasury, 2007), esp. chap. 4 <http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/d/pbr_csr07_king840.pdf>.

72. Richard Brittain and NeBambi Lutaladio, "Jatropha: A Smallholder Bioenergy Crop: The Potential for Pro-Poor Development," *Integrated Crop Management* (Rome: Food and Agriculture Organization of the United Nations, 2010), vol. 8, p. 3.

73. See Godfrey Boyle, ed., *Renewable Energy: Power for a Sustainable Future*, 2nd ed. (Oxford: Oxford University Press in association with the Open University, 2004), p. 45.

74. On this, see the excellent discussion of the contingent nature of our dependence on fossil fuels for energy in Shue, "Avoidable Necessity," esp. pp. 251, 254, 256–57, and 259. The upshot of this is that there is an imperative to develop and transfer clean

(3) *Alternative Agricultural Practices*: Consider now agricultural use. This is responsible for about 10–12 percent of global anthropogenic greenhouse gas emissions.⁷⁵ The four main sources of agricultural emissions are nitrous oxide (N₂O) from the use of fertilizers, methane (CH₄) from enteric fermentation, methane produced during the cultivation of rice, and methane and nitrous oxide from manure.⁷⁶

In each case, it is possible to continue to produce the same specific goods (such as the cultivation of crops and the production of meat and other animal products) but with reduced greenhouse gas emissions. For example, a more efficient use of fertilizers can “decrease N₂O while maintaining yields.”⁷⁷ Second, it is possible to reduce CH₄ emissions from livestock by improving animal feed and altering it to prevent methanogenesis, and to capture CH₄ to produce electricity and heat.⁷⁸ Third, it is possible to reduce N₂O and CO₂ emissions resulting from rice production by using additives, and to reduce the CH₄ emissions resulting from rice production by having better drainage and by using fertilizers that impede methanogenesis.⁷⁹

The key point that these three ways bring out is that greenhouse gas emissions are to some extent substitutable in the narrow sense. Other actions—such as increasing energy efficiency or providing other comparable energy sources or reforming existing agricultural practices—make

technology and non-fossil fuel energy sources. See further Henry Shue, “Responsibility to Future Generations and the Technological Transition,” in *Perspectives on Climate Change: Science, Economics, Politics, Ethics*, ed. Walter Sinnott-Armstrong and Richard B. Howarth (Amsterdam: Elsevier, 2005), pp. 265–83.

75. Pete Smith and Daniel Martino, “Agriculture,” in *Climate Change 2007: Mitigation of Climate Change—Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. Bert Metz, Ogunlade Davidson, Peter Bosch, Rutu Dave, and Leo Meyer (Cambridge: Cambridge University Press, 2007), p. 499.

76. Benjamin J. DeAngelo, Francisco C. de la Chesnaye, Robert H. Beach, Allan Sommer, and Brian C. Murray, “Methane and Nitrous Oxide Mitigation in Agriculture,” in “Multi-Greenhouse Gas Mitigation and Climate Policy,” special issue, *Energy Journal* 27 (2006): 89–108, esp. p. 92.

77. DeAngelo et al., “Methane and Nitrous Oxide Mitigation in Agriculture,” p. 96: cf. also pp. 96–97.

78. See Claudia Kemfert and Wolf-Peter Schill, “Methane Mitigation,” in *Smart Solutions to Climate Change: Comparing Costs and Benefits*, ed. Bjørn Lomborg (Cambridge: Cambridge University Press, 2010), p. 176, cf. pp. 176–77; and DeAngelo et al., “Methane and Nitrous Oxide Mitigation in Agriculture,” pp. 97–99, 101.

79. See Kemfert and Schill, “Methane Mitigation,” p. 177; and DeAngelo et al., “Methane and Nitrous Oxide Mitigation in Agriculture,” p. 99.

it possible to replace some practices that result in greenhouse gas emissions without forfeiting the associated benefits. If this is right, then, insofar as we think that distributive justice should be concerned with the specific goods associated with greenhouse gas emissions, then, *whatever metric of goods (and bads) we are employing*, we should focus directly on the fair treatment of those specific goods (and be concerned with greenhouse gas emissions only to the extent that they, like other phenomena, are associated with those goods).⁸⁰

At this point I should, however, introduce a complication. A critic might point out that in some cases two goods may not be perfect (narrow) substitutes. Consider, for example, non-fossil fuel energy sources. The alternative energy sources might not be perfect substitutes because (1) their supply is unreliable for physical reasons (for example, wind) or for geopolitical reasons (for example, one country is dependent on supplies from an unpredictable country), or (2) they are more expensive to the consumer, or (3) the proposed substitute has undesirable side effects on others that fossil fuels do not have (for example, involuntary displacement arising from constructing dams, or hazards associated with nuclear waste, or aesthetic concerns with wind farms). We may wonder, then, whether my three initiatives are really cases of Narrow Substitutability.

To address this point, it is helpful to note that the three types of substitution I described above can be put into four different categories. First, there are some cases where the proposed alternative has malign effects associated with it which are so serious that the alternative simply should not be adopted. Some might argue that nuclear energy falls into this first category, given the problems associated with the disposal of waste.

Second, though, there are cases where the three initiatives introduced above can act as perfect (narrow) substitutes. For example, the

80. The italicized passage bears noting. The Second General Challenge does not, I believe, rest on any particular metric of justice. It just insists that where X has some very specific advantages and Y those very same advantages, then X and Y should be treated together—regardless of the account of “advantages” one employs (resourcist, capabilities, and so on). The Second General Challenge can, for example, be advanced by resourcists. Consider, for example, “health” (which Dworkin treats as a resource; *Sovereign Virtue*, p. 286). From a resourcist point of view, my Second General Challenge holds that it is a mistake to treat ways of providing health that involve emissions in isolation; rather, we should treat ways of promoting health that involve greenhouse gas emissions together with ways that do not.

energy-efficient building design scheme reported above does not have any undesirable features that render it less attractive than current less energy-efficient housing. In addition to this, while some biofuels have malign effects on others (such as competing with food crops or increasing greenhouse gas emissions), not all do.⁸¹

Third, some of the alternatives proposed above are actually superior to the existing use of greenhouse gas permits. Such alternatives are, therefore, not cases of Narrow Substitutability, for that would imply that consumers would be indifferent between them and the existing technology, whereas in fact they have reason to prefer the alternative. One example of this is increased energy efficiency in cars. For some car drivers, the savings from reduced fuel consumption will outweigh the initial extra cost in the purchase of the vehicle.⁸² Other examples are given by the World Bank, which notes that many ways of reducing emissions from agriculture will in fact also enhance productivity and produce side benefits (such as bioenergy).⁸³

Finally, there are cases where an alternative energy source has some disadvantage for the consumer of energy, but where this can be compensated for in such a way that the user regards a fossil fuel form of energy, on the one hand, and the “alternative-plus-compensation,” on the other hand, as substitutes. This kind of case takes us out of the realm of pure Narrow Substitutability toward a continuum where substitutions can occur that combine aspects of both Narrow and Wide Substitutability. They include an aspect of Narrow Substitutability because they offer a good that is similar in kind to the goods that greenhouse gas permits bring. However, because the substitution is imperfect (it does not provide *exactly* the same goods), a kind of Wide Substitutability is also included (in the form, say, of extra permits or financial compensation) to make up for the imperfection of the alternative energy source.⁸⁴

81. For further details, see the Nuffield Council on Bioethics, *Biofuels: Ethical Issues* (London: Nuffield Council on Bioethics, 2011).

82. *The King Review of Low-Carbon Cars Part I*, p. 46.

83. World Bank, *World Development Report 2008: Agriculture for Development* (Washington, D.C.: World Bank, 2007), p. 201.

84. For a related point, see Jonathan Wolff’s argument that Goodin’s distinction between “means replacing” and “ends-displacing” compensation is too rigid: Wolff, “Addressing Disadvantage and the Human Good,” *Journal of Applied Philosophy* 19 (2002): 209.

The key point nonetheless remains: permits to emit greenhouse gas emissions can in many cases be substituted in a (perfect) narrow sense (as well as sometimes being substitutes in the third and fourth categories described in the last two paragraphs). For these reasons, then, the Second General Challenge holds: it is inappropriate to focus on greenhouse gas emissions when there are (narrow) substitutes for these emissions.⁸⁵

VIII. A NEW START

This article has so far focused solely on criticizing one leading approach to distributing greenhouse gas emissions.⁸⁶ In this section, I build on some of the preceding arguments to outline and motivate support for a different way of approaching the issue. My proposal consists of five claims.

A. Step 1: The Normative Starting Point

The first claim is as follows:

Step 1: To analyze what would be a fair distribution of greenhouse gases, one has to start with one's account of distributive justice where that includes:

- (a) principles governing what is owed to all persons as well as to fellow citizens (principles of global justice),
- (b) principles governing the treatment of persons' contemporaries and the treatment of future generations (intergenerational justice), and
- (c) principles governing the rights and responsibilities that persons inherit as a result of wrongdoing in the past (historic injustice).⁸⁷

85. One implication of this is that it is a mistake to criticize the equal per capita view on the grounds that it is unfair to those with greater needs: it depends on whether they have access to narrow substitutes.

86. In a longer version of this article, I present a *Third General Challenge*, which objects to the Atomist assumptions on which the equal per capita view depends.

87. Note: the persons affirmed in Step 1 could include nonhuman animals. I am not committed to this, but, in line with my aim to set out a method and not to specify any particular substantive conclusions, Step 1 should be interpreted to allow this possibility.

Step 1, I believe, follows from a number of the arguments that have been adduced above. In particular, *if* it is inappropriate to treat greenhouse gases in isolation from other issues of justice (as was argued in sections IV–VI), and *if*, moreover, the emission of greenhouse gases has value *only* insofar as it enables people to enjoy their legitimate entitlements (as was argued in section VII), *then* it follows that an analysis of the fair distribution of greenhouse gas emissions must be grounded in an understanding of what persons (current and future, within one's state and across the world) are entitled to do. To consider what would be a fair distribution of greenhouse gases, one *must* then start with an account of what persons are entitled to as a matter of justice, and work back from that to deduce what share of emissions they are entitled to.

Note, however, that Step 1 does not require that we employ what I termed a Maximal account of justice. Following on from the pragmatic considerations discussed in section VI, one might quite reasonably endorse Step 1 and use a Minimal account of justice. Some might be wary of invoking a Maximal theory of justice (which applies to all persons throughout the world, including current and future people) on the grounds that (i) our understanding of global and intergenerational justice is currently highly underdeveloped (moral uncertainty), or that (ii) there is such profound disagreement that it seems unlikely we can reach a reasoned consensus any time soon (the need to respect reasonable disagreement), or that (iii) proposed Maximal accounts are not likely to be realized in practice because of political opposition (political feasibility). A more Minimal approach can sidestep, or at least minimize, these three concerns and there is thus some reason to employ a Minimal account of justice when applying Step 1.

In what follows I shall not, however, argue for any particular view.⁸⁸ My aim is to provide an account of *how* one might best think of the appropriate distribution of greenhouse gas emissions, rather than to give a specific answer to that question. I shall outline the *method* by which one can work out what would constitute a fair share of emissions and shall not advance any specific *substantive* answer. In order to illustrate the method, however, I shall assume a view that holds that (global and

88. For my own view, see *Justice beyond Borders: A Global Political Theory* (Oxford: Oxford University Press, 2005).

intergenerational) distributive justice requires that the basic needs of all persons current and future and throughout the world are met.

B. Step 2: The Sustainability Condition

Having outlined the first step, we may turn now to the second step. This states:

Step 2: One must assess whether the account of distributive justice affirmed in Step 1 makes demands on the natural world that can in fact be met.

Step 2 arises because there is a two-way relationship between, on the one hand, the realization of any given account of distributive justice and, on the other hand, the state of the natural world. More precisely, it arises because of two phenomena: namely, (A) that the realization of any proposed scheme of distributive justice is likely to have a marked effect on the natural world (what we might call “the environmental impact claim”), and (B) that the state of the natural world is likely to have an effect on the extent to which one can realize any given scheme of distributive justice (what we might call “the environmental preconditions claim”).

Consider (A) first. Realizing proposed schemes of distributive justice has environmental impacts for several different reasons. In the first place, (i) principles of distributive justice standardly require, or permit, the utilization of natural resources. Some of these natural resources (including, for example, oil and petroleum, natural gas, uranium, and coal) are nonrenewable and, as such, are finite. Thus, the use by some now affects whether others now and in the future can also use this resource. Note, moreover, (ii) that this problem arises not simply because of nonrenewable resources. It also applies to resources that are renewable but that take time to be renewed. In such cases, the heavy use by some over an extended period of time might have the consequence that some future people will be unable to use these resources because the time necessary for renewal has not elapsed. Think here of forests and the time needed for new trees to grow. Or consider fertile land that is used year after year rather than allowed to rest fallow so that it may recover. Finally, note (iii) that human activities may also create environmental hazards. For example, pollution may lead to ocean acidification;

changing land use may lead to biodiversity loss, which in turn may compromise some vital human interests such as health; emitting CFCs may erode the ozone layer and thus increase the incidence of cancer; the use of fertilizer to meet agricultural needs may result in nitrogen and phosphorus entering the water supply and harmfully affecting people and animals who use that water. The realization of any proposed scheme of distributive justice specifying what rights people have over natural resources and what they are entitled to do (such as use rare minerals, drive, fly, use pollutants, build on land, engage in deforestation, and increase agricultural yield) is thus likely to have environmental impacts.

Consider now (B). (B) draws our attention to the fact that the realization of principles of justice frequently requires that the natural world contains certain natural resources to which people can have access (phenomena [i] and [ii] above), and that it does not contain certain hazards (phenomena [iii] above). To give some examples: any account of the human right to health will require a low level of pollution (to avoid threats stemming from respiratory problems), a safe and stable ozone layer (to avoid cancer from ultraviolet sunlight), a stable climate (because of the way that climate change leads to heat stress and the spread of some diseases), and the protection of biodiversity (which is a source of many medicines). In addition to this, any account of distributive justice that is concerned with the prevention of malnutrition will be concerned to prevent the onset of dangerous climate change, for this jeopardizes access to food and water. Or to give another example: where a theory of justice insists that all persons—present and future—must enjoy a given standard of living, *S*, and where, moreover, *S* can be realized only by using a given nonrenewable resource *R* (for example, fossil fuels), we need to know whether there are sufficient amounts of *R* to meet the postulated principles of intragenerational and intergenerational justice, *S*. In short: principles of justice have environmental preconditions.

Now given (A) and (B), it follows that the practices permitted by one component of a proposed theory of justice (for example, its account of what those currently alive are entitled to do) may have environmental effects which entail that another component of that theory (most notably its account of what those currently alive owe to future generations) simply cannot be attained. Where a theory has this character, it fails what

I have termed the “sustainability condition.”⁸⁹ What we need is an account of justice that does not have environmental impacts that undercut its ability to realize its own principles.⁹⁰

Where an account of distributive justice offered in Step 1 is incompatible with the “sustainability constraint” affirmed by Step 2, then we are required to reexamine the claims made in Step 1 and to make adjustments to its component parts (including its account of entitlements for contemporaries and future people) until it is sustainable. This may, for example, involve rethinking one’s initial account of how much one generation owes to its successors. Or it may involve revising one’s initial account of what is owed to contemporaries. Of course it may involve revising both. This process must proceed until we have an account of global and intergenerational justice that we think is normatively compelling and that can be attained given the state of the natural world.⁹¹

C. Step 3: The Greenhouse Gas Implications

Once we have a theory of distributive justice that is compatible with the “sustainability condition” as specified in Step 2, our third task is to ascertain what implications these principles of distributive justice have for the distribution of greenhouse gases. As was argued above, from the point of view of a theory of justice, greenhouse gas emissions have significance *only* insofar as they further, or are otherwise entailed by, people’s legitimate entitlements. The distribution of greenhouse gases must then be determined by our understanding of people’s entitlements. We must hold in our mind’s eye our account of a just and sustainable society (as determined by Steps 1 and 2) and then work back and ascertain what distribution of greenhouse gas emissions is entailed by this account.

89. Note that assessing whether a given theory of distributive justice fails the “sustainability condition” requires an analysis of the extent to which the loss of some natural capital can be compensated for by the provision of increased wealth or capital. For further discussion of these issues, see Andrew Dobson, *Justice and the Environment: Conceptions of Environmental Sustainability and Dimensions of Social Justice* (Oxford: Oxford University Press, 1998).

90. See, in this context, Johan Rockström et al., “Planetary Boundaries: Exploring the Safe Operating Space for Humanity,” *Ecology and Society* 14, article 32 <<http://www.ecologyandsociety.org/vol14/iss2/art32/>>.

91. I conceive of this process of revising the separate parts until the parts cohere in a plausible way as proceeding along similar lines to Rawls’s notion of “reflective equilibrium.” Rawls, *A Theory of Justice*, pp. 40–46.

To see how this would work, consider the account of justice that I mentioned that I would use to illustrate my method. This, recall, stipulates that the basic needs of all persons (current and future) must be met. What Step 3 involves is working back from each basic need to determine what greenhouse gas distribution is needed to meet this.

Suppose, for example, that we are committed to meeting health needs and subsistence needs.

(a) Consider the need for food first. Satisfying people's need for food requires a great deal of energy, and this may involve the use of fossil fuels. As a recent report on *Energy and the Millennium Development Goals* records, "energy in the form of heat is required to cook 95 percent of the basic staple foods that form the basis of human nutrition. Most cooked food also requires water, which must be pumped and transported. Growing food crops also requires energy inputs for planting, irrigation, harvesting, and post-harvest processing."⁹² Energy is also needed for the transportation and refrigeration of food. In addition to this, as we saw above, the use of fertilizer releases greenhouse gases (CO₂, N₂O, and CH₄) and livestock release CH₄. Thus, the production and cultivation of food, its transportation, its storage, and the preparation of food all (normally) involve the emission of greenhouse gases. One can thus work back from people's entitlement to food and derive an account of the greenhouse gas emissions needed to achieve this entitlement.

(b) Consider now health needs. The same process can be applied there. For people to enjoy a minimally acceptable standard of healthcare provision, it is necessary to employ a considerable amount of electricity, and this too (generally) involves fossil fuels and thus greenhouse gas emissions. Meeting health needs may have implications for the emission of greenhouse gases in a number of different ways. For example:

Health care infrastructure even in the smallest clinics and health centers relies on refrigeration for vaccines and sterilization. Illumination for patient care after dark, for operating theaters, and for public safety surrounding hospitals increases the health systems' ability to

92. Vijay Modi, Susan McDade, Dominique Lallement, and Jamal Saghir, *Energy and the Millennium Development Goals* (New York: Energy Sector Management Assistance Programme, United Nations Development Programme, UN Millennium Project, and World Bank, 2006), p. 23.

serve poor populations. Improved lighting and hygiene from clean water would help reduce women's mortality rate at childbirth. Modern fuels and/or electricity are essential for these functions. Electricity is essential for many medical instruments, illumination, medical record keeping, communications facilities for reporting medically significant events, and medical training.⁹³

Thus, from an understanding of what people's health needs are, one can derive an account of how energy should be distributed.

This process can be reiterated for other key needs, such as housing, heating, and education. By identifying persons' entitlements and then their implications for the use of greenhouse gas emissions, one can then derive an account of how greenhouse gas emissions should be distributed.⁹⁴

D. Step 4: The (Narrow) Substitutability Proviso

Step 3 can, however, only be endorsed in a provisional sense. For when applying the method outlined above, one must be careful not simply to move from the fact that an activity requires energy, for example, to the conclusion that it must require fossil fuels. As I stressed in my discussion of "Narrow Substitutability" in section VII, energy needs can, in some circumstances, be met in other ways. An account of people's energy needs thus does not straightforwardly entail any specific allocation of greenhouse gas emissions. Realizing people's entitlements may then, in practice, be compatible with a variety of different distributions of

93. *Ibid.*, p. 29. See also the discussion of the 5th and 6th Millennium Development Goals (respectively, maternal health and disease) on p. 34.

94. For an excellent example of the kind of analysis called for by Step 3, see Narasimha D. Rao and Paul Baer, " 'Decent Living' Emissions: A Conceptual Framework," *Sustainability* 4 (2012): 656–81. See, more generally, the "Greenhouse Development Rights" approach pioneered by Paul Baer, Tom Athanasiou, Sivan Kartha, and Eric Kemp-Benedict. See their *The Greenhouse Development Rights Framework: The Right to Development in a Climate Constrained World*, rev. 2nd ed. (Berlin: Heinrich Böll Foundation, Christian Aid, EcoEquity, and the Stockholm Environment Institute, 2008). For a similar approach that is explicitly integrationist, see also John Eyckmans and Erik Schokkaert, "An 'Ideal' Normative Theory for Greenhouse Negotiations," *Ethical Perspectives* 11 (2004): 12–17.

The Greenhouse Development Rights approach is compatible with the first three steps of my approach. However, it does not recognize the importance of narrow substitutability (Step 4 of my account) and thus does not adhere to Step 5 either.

greenhouse gas emissions, depending on what other energy sources are employed.

This gives the approach I am canvassing two related virtues. First, since meeting people's energy (and agricultural) needs can be done in more than one way, it offers those who are responsible for providing energy (and food) more *freedom* than do alternative approaches such as the equal per capita approach. It grants the relevant parties more leeway in how to discharge their duty. Second, and related to this, its flexible character increases its *political feasibility*. It may, for example, allow some to have higher emissions than would otherwise be the case, if they generate high amounts of clean technology for others and enable others to boost their energy efficiency. This renders it more politically realistic. Isolationist approaches, by contrast, introduce a rigidity into any distributive framework, for they insist that the distribution of greenhouse gas emissions must take a certain specific shape; and that makes them inherently less flexible and less feasible.

E. Step 5: Indeterminacy and the Role of Institutions

In the previous step, I noted the advantages of the fact that people's needs for energy and agriculture can be realized in a variety of different ways and not just in ways that require, say, fossil fuels or high-emitting agricultural practices. This diversity has, however, another implication, namely, that there needs to be a political process (at different levels of governance) in which the participants can select from the various different combinations available and agree among themselves precisely how people's entitlements are secured.⁹⁵ That is, there must be political fora where the participants decide whether particular people's needs for energy are to be provided for by fossil fuels or hydroelectric or solar energy or by some other energy sources. The only way to move from the multiple possible combinations that are thrown up by Step 4 to any specific outcomes is to have political processes in which the relevant parties decide what particular combination of natural resources will be employed in order to realize people's entitlements (as determined by Steps 1 and 2).

95. For an instructive discussion of the role institutions can play in addressing indeterminacy, see Allen Buchanan, *Justice, Legitimacy, and Self-Determination: Moral Foundations for International Law* (Oxford: Oxford University Press, 2004), pp. 180ff.

This completes my outline. The account here does, of course, need to be developed further. Most obviously, the claims in Steps 1 and 2 need to be given substantive content.⁹⁶ As I have stressed above, however, my aim here is to set out the methodology. My claim is that following the above five-step process would enable us to determine what would be a fair distribution of greenhouse gas emissions. The key is *not* to treat greenhouse gases in isolation, but rather to locate them in a more general theory of justice. Only in that way do we put greenhouse gas emissions in their rightful place. The fair distribution of greenhouse gases is, we might say, epiphenomenal. There is a fair distribution of burdens and benefits more generally; satisfying this will bring in its wake a certain distribution of greenhouse gas emissions.

IX. CONCLUSION

This article has covered a considerable amount of ground, so it may be helpful to sum up. I have argued, first, that, contrary to the claims of many, we have no reason to accept the claim that greenhouse gas

96. One important substantive question is how questions of reproductive justice would be included within this account. The number of people there will be will greatly affect what is ecologically sustainable; so to apply my account, we must address issues of demographic change and population policy.

I have addressed this elsewhere: “Tolstoy’s Question” (unpublished Oxford Amnesty Lecture 2012). In brief, my response is this: Future population size is not fixed and will be affected by the policies adopted by current and future generations, including not just their civil rights to reproduce but also the level of access to affordable contraception, the educational and employment opportunities for women, and the level of development, all of which affect demographic change. Given this, my approach entails that when ascribing entitlements to people in Step 1 (including those rights that affect future population size and profile), we must ensure that they do not result in population growth that, *when combined with other factors*, violates the sustainability condition (Step 2) and thereby undercuts the realization of justice. Realizing a scheme of justice that will result in continued dramatic population growth will put pressure on the future realization of justice. However, the italicized passage above is important: what is ecologically sustainable depends not simply on (i) population size, but also on (ii) what principle of intergenerational justice we affirm, (iii) the extent to which it is possible for technological innovation to enable people to *mitigate* the environmental degradation they cause and to *adapt* to a degraded world, (iv) how much people in fact invest in any such technological innovation, and (v) how much current generations consume. From this, it should be clear that my account does not stipulate any particular optimum population: it permits different population sizes, depending on how much people consume and how much they invest in technological innovation and diffusion. I am grateful to an anonymous referee for pressing me on this issue.

emissions should be distributed on an equal per capita basis. None of the four arguments considered supports this conclusion (section III). Whether we conceive of justice along the lines canvassed by Model I or Model II, neither of these approaches would support the equal per capita view or the Isolationist approach to greenhouse gas emissions on which it depends (sections IV–VII). My critique of the equal per capita view is thus not dependent on any one particular theory of justice; rather, it is robust across a wide variety of different theories of justice.

Second, I have argued, more generally, that the equal per capita view is vulnerable to two General Challenges. If correct, these challenges undermine not only the equal per capita view, but *any* approach that treats the distribution of rights to emit in isolation from other issues of justice.

Finally, I have outlined an alternative way of thinking about greenhouse gas emissions (section VIII). I have not provided a *substantive* answer to the question posed at the start, but, building on my criticisms of the equal per capita view, I have outlined the *method* by which one can ascertain what would constitute a fair distribution of greenhouse gas emissions.