

A Just Response to Climate Change: Personal Carbon Allowances and the Normal-Functioning Approach

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One of the normative aspects of climate change that has received relatively little attention from philosophers is the proposal that states reduce their greenhouse gas emissions by issuing “personal carbon allowances” (PCAs)—also sometimes called “domestic tradable quotas” (DTQs), or “tradable energy quotas” (TEQs)¹—to each of their citizens. According to this proposal, citizens would be required to surrender PCAs in order to engage in various greenhouse gas emitting activities. The number of PCAs issued each year would decline, so as to ensure a year-on-year reduction in national greenhouse gas emissions. One version of the proposal holds that a supranational system of PCAs could provide a global solution to climate change, with everyone on the planet receiving PCAs equivalent to a per capita share of global emissions. While a supranational system of PCAs *could* provide a global solution to climate change, it would be extremely difficult to implement a supranational system of PCAs, and unrealistic to expect global leaders to sign up to such a system.² On the other hand, a domestic version of the proposal suggests an attractive way for states to share out emissions among their own citizens, however emissions are to be shared out between states.

The proposal domestically to issue PCAs was first developed in the 1990s by Mayer Hillman and David Fleming.³ More recently, the proposal has been further developed by Richard Starkey and Kevin Anderson at the Tyndall Centre for Climate Change Research,⁴ and promoted in popular books by Mayer Hillman and Tina Fawcett, and by George Monbiot.⁵ Support for the proposal to issue PCAs has been particularly strong among civil society groups, although the proposal is also being taken seriously at government level.⁶ A recent survey showed PCAs to be the most favored method for reducing national emissions among respondents randomly selected from the UK population.⁷ The Royal Society for the Arts project *CarbonLimited* recently piloted the use of Internet-based models of PCAs.⁸

While PCAs could in theory be used by all countries to regulate their national emissions, the focus of the present paper will be on the fair implementation of a scheme of PCAs in the *developed* world, and most of the examples will be drawn from the developed world context. This is for two principal reasons. First, because developed countries already have in place most of the political, social, and economic institutions necessary for the effective functioning of a system of PCAs. Second, because the countries that are committed by the Kyoto Protocol to

making significant short-term cuts in their national greenhouse gas emissions—the so-called “Annex One countries”—are all developed countries.

1. Why Personal Carbon Allowances?

Three main considerations motivate the use of PCAs rather than alternative policy instruments such as tax or industrial quotas. First, an oft-cited benefit of quota-based approaches in general (including both PCAs and industrial quotas) is that quota-based approaches allow policymakers to ensure that greenhouse gas emissions will not exceed a particular cap.⁹ This consideration provides only a limited reason to prefer quota-based approaches, however, since a tax-based approach could also be configured in such a way so as to approximate a cap on emissions. For example, a cap could be approximated by having marginal tax rates increase as an agent’s emissions increase, such that emissions become progressively more expensive and eventually—provided that tax rates are high enough—prohibitively expensive.

Second, it is sometimes argued that PCAs, implemented in an appropriate manner, will serve to motivate citizens to “do their bit” in the belief that they are contributing fairly to a larger effort to combat climate change.¹⁰ The point here is not merely that citizens will be motivated to reduce their emissions: This outcome could be achieved just as well by a tax-based approach. Rather, the point is that agents’ motivation to reduce their emissions is less likely under a system of PCAs to be entirely economic. The economic motivation would be supplemented by the additional moral motivation accompanying the belief that one is contributing one’s fair share to the burden of discharging a collective responsibility. Nevertheless, from the point of view of averting the worst that climate change threatens, one might reasonably respond that it does not especially matter whether the motivation to reduce emissions is provided by economic reasons or moral reasons: the important thing is simply that we *do* reduce our emissions.

The third and most persuasive reason to adopt PCAs over alternative schemes is that PCAs allow policymakers to be much more sensitive to issues of fairness. Alternative schemes like tax incentives and industrial quotas force consumers to pay the costs of reducing emissions in direct proportion to their purchases of emission-dependent goods, thereby linking access to emission-dependent goods solely to ability to pay. A suitably designed system of PCAs, on the other hand, would allow policymakers to ensure that emission-dependent goods are distributed not merely in accordance with ability to pay, but in a manner sensitive to issues of fairness. This consideration, it seems to me, provides the strongest case for adopting a system of PCAs over alternative schemes.

One of the questions that I will consider in this paper is the question whether PCAs should be tradable. In the light of what I have just said—that the strongest case for PCAs over alternative schemes like industrial quotas and taxes is its ability to decouple access to emission-dependent goods from ability to pay—one might think that I am already committed to the view that PCAs should *not* be

tradable. Surely if PCAs *are* tradable then access to emission-dependent goods *would* be determined by ability to pay? Indeed it is true that, under a scheme of tradable PCAs, access to emission-dependent goods would be partly linked to ability to pay. But—unlike industrial quotas and taxes—under a scheme of tradable PCAs, access to emission-dependent goods would not be *wholly* determined by ability to pay, since the initial allocation of PCAs would also play a role in determining access to emission-dependent goods. An agent who has little money but who is allocated, at no cost, lots of PCAs, may have as much access to emission-dependent goods as an agent with lots of money who is allocated few PCAs. The poorer agent may indeed sell some of his PCAs to the wealthier agent, but it is not at all obvious that the resulting distribution of access to emission-dependent goods would be unfair, since an agent who sells his PCAs would be compensated by that which he receives in return for his PCAs. It remains an open question, then, whether PCAs should be tradable. One may endorse PCAs because they permit sensitivity to fairness, without being committed to the view that PCAs should not be tradable.

2. Implementing Personal Carbon Allowances

In designing a system of PCAs, fairness is not the only consideration to be taken into account, and for reasons of cost and practicality, most advocates of PCAs, including Hillman, Fleming, Starkey, and Anderson (cited above), would restrict their use only to household energy and personal transport (including, on some models, aviation and public transport). Individual consumers would not be required to use PCAs to purchase other goods, because the cost and difficulty of calculating their embodied emissions—emissions on which production of the good relied—would be prohibitively high. In a concession to reality at the expense of fairness, it is proposed that emissions involved in the production of these other goods be regulated by other means, for example by the sale of emission permits to the firms that manufacture or provide them (though with tighter emission caps than those currently used in existing industrial permit schemes like the EU Emissions Trading Scheme (ETS), from which some firms have made windfall profits as a result of excessive allocations). Nevertheless, in developed countries at least, household energy and personal transport account for a large share of national emissions, so even if the remaining emissions were constrained by other means, PCAs would still be a major feature of many of the world's largest economies.¹¹

Considerable work has been done on the technical aspects of implementing a scheme of PCAs, for example, on quantifying the emissions embodied in various forms of transport. But there remains an urgent need for work to be done on the philosophical aspects of PCAs. For despite the growing interest in PCAs, most philosophical discussions about greenhouse gas emissions continue to focus on the justice of different proposals for distributing emissions *between* states. Such discussion is important in itself and, as we will see, some of the normative appeals made in the context of such discussions will also be relevant to the domestic

implementation of a system of PCAs. But there is nevertheless a significant gap, which this paper aims to fill, insofar as distributional aspects of an *intranational* system of PCAs remain largely unaddressed. States have characteristics of potential moral relevance that individuals do not have, and distributing emission rights between them therefore raises philosophical issues unique from those raised by the problem of distributing emission rights among individuals. States, for example, unlike individuals, have populations of different and changing sizes, they have identities that span several generations with associated long histories of benefiting (or not) from different emission levels, they have economies of differing sizes and with differing characteristics. As such, although some of the normative principles applicable to the international case may still be relevant to discussion of the domestic case, we cannot assume that these principles will automatically apply in identical fashion to both cases.

Philosophical questions about the distribution of PCAs can be divided into two types. First, there are questions about how to allocate PCAs to individuals. Second, there are questions about carbon accounting, about how to work out how many PCAs an individual need surrender in order to purchase a particular emission-dependent good. Although the focus of this paper will be on the first set of questions, I nevertheless wish to make a few preliminary remarks about the second, in order to expose a thread in our intuitions about fairness that is relevant to both. In particular, I offer a few comments on the problem raised by the need to disaggregate individual agents' responsibility for the greenhouse gas emissions embodied in collective services. The problem is illustrated by the example of flying. If an agent takes a flight and the flight is only half full, should he be required to surrender twice as many PCAs as he would have done had he been on a flight identical in all respects except that it was full? Should he be required to surrender extra PCAs to carry more luggage on board? In these and similar cases, intuition suggests that we should be guided by the loosely stated principle that an agent should be required to surrender more PCAs for *choosing* to take a more carbon-intensive option than a less carbon-intensive one, but not for being given a more carbon-intensive option for reasons beyond their control. That is, our calculations should be sensitive to choice but not to unchosen circumstance. So, for example, if an agent, purchasing a flight ticket, chooses a higher-class seat with more leg room than an economy-class seat (thereby permitting less people to be carried on the flight), then it seems fair that he should be required to surrender more PCAs for his ticket than an agent who purchases an economy-class seat. But an agent who books himself on a flight which turns out, unbeknown to him at the time of booking, to be half full, then he should not be required to surrender any more PCAs than an agent who books himself on a flight identical in all relevant respects except that the flight turns out to be full. Such an approach would maximize both the intuitive moral appeal of a system of PCAs and the beneficial incentives created by the system—whenever an agent has a choice in the matter, PCAs provide an incentive to choose the least carbon-intensive option. These tentative comments are not, of course, intended to be conclusive. The principle

certainly needs further clarification and justification. But they will hopefully be helpful nevertheless, if only because, as we will see, they tie in with a wider commitment to choice-sensitivity and circumstance-insensitivity running through our moral intuitions about how fairly to implement a system of PCAs.

Note that I will not address herein questions about how we should distribute the burden of compensating victims of climate change or of helping them to adapt to a changing climate. While it is possible to design a system of PCAs with the aim of raising funds to compensate the victims of climate change—for example, by auctioning PCAs and spending the proceeds on compensation or adaptation—it would be inappropriate to do so. To the extent that we commit ourselves to raising such funds through a system of PCAs, we commit ourselves to linking the distribution of the burden of discharging our collective duty to reduce greenhouse gas emissions to the distribution of the burden of discharging our collective duty to compensate the victims of climate change. But we should not link these two distributions, since different moral principles are likely to apply in each case. As Vanderheiden notes, equity-based principles are likely to play a stronger role when allocating future emission shares, whereas responsibility-based principles should be more significant when allocating the costs of compensation and adaptation.¹²

In order to determine how we should allocate PCAs, we need to know why we should be concerned about their distribution at all. I will argue that there are two very different rationales that motivate a concern with the distribution of PCAs. Although appeals are often made to both rationales in popular discussion of PCAs, it is important that they be clearly distinguished, since they have quite different implications for the distribution of PCAs. The first rationale for a concern with the distribution of PCAs is what I will call the rationing case. The rationing case is concerned to ensure that all agents have an appropriate level of access to a particular good or group of goods. The rationing case is not content to leave the distribution of PCAs to the market. The second rationale for a concern with the distribution of PCAs is what I will call the initial distribution case. The initial distribution case is quite happy to leave the distribution of PCAs to the market, but is concerned to ensure that PCAs are introduced into the market in a fair way. Both rationales appeal to principles underlying widely shared moral intuitions not only about fair distributions of emission rights, but about fair distributions of goods in society more generally. Insofar as these principles claim universal applicability, so too do the rationales for a concern with the distribution of PCAs.

3. The Rationing Case

The case for a regime of PCAs is often compared to the case for rationing essential supplies during World War II. Such a case appeals to the claim that, left to its own devices, the market would provide an unacceptable distribution of a particular good or group of goods. The distribution may be considered

unacceptable because it would allow some agents to evade their moral responsibilities, because it would result in the denial of some agents' basic needs or prevent them from developing central capabilities,¹³ because it would be too unequal, or for other reasons. The concern that motivated rationing during World War II, for example, was a desire to ensure that particular needs—for food and fuel and so on—were universally met during times of scarcity (hence expectant mothers and children were allowed more milk and eggs than others, reflecting their different nutritional needs). Although the motivations that may underlie a case for rationing PCAs are diverse, they have one important feature in common: They all insist on the moral importance of maintaining a particular patterned distribution of some particular good across individuals in society—either PCAs themselves or some other emission-dependent good or group of goods. As such, a central implication of the rationing case is that it requires that PCAs *not* be tradable. PCAs must not be tradable in order to avoid creating a new market in PCAs that will determine the distribution of emissions, offering no guarantees that the moral concerns of those moved by the rationing case will be catered for.

Note that the rationing case does not necessarily require that we *equalize* PCAs, depending on the motivation that underlies the case. The basic needs motivation, for example, requires only that everyone has sufficient PCAs to meet their basic needs; if any extra PCAs beyond those required for sufficiency are left within the overall limit, the basic needs motivation is neutral on how they ought to be shared out. It is even possible to be motivated by equality without being committed to equalizing PCAs, depending on what it is that we want to equalize. If one is concerned to equalize access to the rationed good itself, then one will indeed want to distribute PCAs equally. But it will often not be the rationed good itself that is important, but some other good which the rationed good is instrumental to promoting. One might, for example, think it important to equalize people's ability to keep their houses warm, and on that basis ration PCAs unequally, because it requires more energy to keep some houses warm than others.

How strong is the case for rationing? Many economists and politicians have opposed non-tradable PCAs because, unlike tradable PCAs, they will not yield emissions cuts in the most economically efficient manner. This is an important consideration, but it need not be the decisive one. If there are strong moral reasons *for* rationing, then we might decide that those reasons are ultimately more important than the economic considerations. So let me restate the question of present interest: how strong is the *moral* case for rationing non-tradable PCAs? There is, of course, no one general answer to this question. The strength of the case for rationing depends on the strength of the arguments in its favor, and we must consider the merits of each such argument individually.

3.1 *A Duty to Reduce One's Own Emissions*

First, one argument for rationing non-tradable PCAs says that everyone has a duty significantly to reduce their own greenhouse gas emissions and not merely to

buy their way out of such reductions. This mirrors a case against trading at the international level put by Sandel, who writes that “turning pollution into a commodity to be bought and sold removes the moral stigma that is properly associated with it.”¹⁴ The argument seems to me implausible. Why should we account for agents’ shares of the collective burden to address climate change in terms of greenhouse gas emissions rather than in terms that allow agents to discharge their share of the collective burden in whatever manner they would most prefer to do so? Agents who would buy extra PCAs if given the opportunity to do so would still be making a sacrifice as a result of the cap on emissions imposed by the system of PCAs. Their sacrifice would be paid for in monetary terms rather than greenhouse gas emissions, but the disvalue of the burden shouldered would be identical—in market terms—to the disvalue of forgoing the quantity of emissions permitted by the purchased PCAs. Sandel compares buying emission permits to paying a fee in order to throw a beer can into the Grand Canyon. But the analogy is flawed, since the emissions of an agent who buys extra permits remain within the overall limit of permissible collective emissions, whereas *any* beer cans thrown into the Grand Canyon exceed the number of beer cans—none—which can be permissibly thrown into the Grand Canyon.¹⁵

3.2 *Basic Needs and Central Capabilities*

A second argument for rationing non-tradable PCAs is that a trade in PCAs could result in some agents being unable to satisfy basic needs, or to develop central capabilities, because they have insufficient access to emission-dependent goods. Shue endorses a position along these lines, justifying the rationing of emission rights by reference to what he calls *subsistence rights*.¹⁶ The problem with this argument is that a trade in PCAs would not, provided that PCAs are initially allocated in an appropriate manner, prevent agents from satisfying their basic needs, or developing their central capabilities, unless they *chose* to trade away their PCAs. So this argument requires a commitment to the claim that emission-dependent needs or capabilities should be satisfied *even if* the agent would prefer to satisfy alternative desires instead. Again, I find this claim highly implausible. At best such paternalism is unnecessary, and at worst it can be positively harmful. If the relevant needs or capabilities really are so important, then they will be given priority among an agent’s own preferences anyway. And if they are not so important, then why should we enforce our own view about what is best for an agent over their own?

Shue argues that minimum emission rights necessary for subsistence should not be tradable by analogy with food stamps.¹⁷ “Decent societies,” he writes, “do not in fact market all their food but, instead, reserve significant amounts of it to be distributed by way of food stamps, or their functional equivalent, which are not themselves supposed to be marketed but distributed according to need.” But if giving out food stamps is a mark of a decent society, then that is because giving out food stamps ensures that agents who are unable to afford food will

nevertheless have access to food, and such provision does not depend upon the food stamps that they receive not being tradable. Likewise, even if we agreed with Shue that society ought to ensure that all agents have sufficient access to emission-dependent goods for subsistence (I will discuss in the final section of this paper whether or not society does have such an obligation), then this would only entail that society ought to give a minimum quantity of PCAs to agents, and not that those PCAs should not be tradable. We should not confuse a needs- or capabilities-based argument for doing something for an agent (like giving her PCAs), with a needs- or capabilities-based argument for requiring an agent to do something for herself (like not allowing her to sell her PCAs). It is one thing to argue that, morally, A should do ϕ for B so that B's basic needs can be met, or so that B's central capabilities can be developed; but it is quite a different thing to argue—much less plausibly—that, morally, A should do ϕ for A, so that *her own* basic needs can be met or central capabilities satisfied.

Note that at the international level, considerations along the lines of those just discussed provided the major rationale for a provision in the Marrakesh round of climate negotiations that rich countries should not be able to buy, nor poor countries be able to sell, more than a certain percentage of national emissions. Such a limit on trade seems to me more justifiable at the international level than at the individual level. For in the international case, the consequences of a government's decision to sell emission quotas fall not only on the government itself, but also on the individual citizens whom it governs. Since there is a greater likelihood that governments of poor countries will make decisions about selling national emission quotas that harm their citizens, than the likelihood that individuals will make decisions about selling their own PCAs that harm themselves, a limit on trading intended to protect citizens of poor countries against the consequences of bad decisions by their government might well be justifiable. That is, we should not limit trading in order to protect individuals against themselves, but perhaps we should limit trading in order to protect individuals against their governments.

3.3 *Worsening Existing Injustices*

Finally, a third reason for opposing a trade in PCAs appeals to the claim that such a trade will worsen existing social injustices. We would not, according to this view, be concerned about a trade in PCAs if we lived in a just society. But given that we do not live in a just society—because distributions of goods in society are the result of historical injustices, or because they do not satisfy wider egalitarian principles of justice—we ought not to allow a trade in PCAs. Rather, we ought to distribute PCAs in a just manner and insulate that distribution against the unequalizing effects of the market.

In what sense would a trade in PCAs worsen existing injustices? Not in the sense of giving the rich more *overall* or the poor less *overall*. When a rich agent buys a PCA from a poor agent, the value of each agent's overall holdings remains

unchanged, since the value of the PCA is equal to the value of the money transferred. The only sense in which a trade in PCAs would worsen existing injustices is in the sense that the rich would, because of the injustice, have greater access than the poor to emission-dependent goods. But why arbitrarily pick out access to emission-dependent goods? The rich may have greater access to emission-dependent goods if PCAs are tradable than if they are not, but they would also have less access to other goods (because they will have spent some of their money on PCAs), and the poor will have more access to other goods (because they have earned money by selling PCAs). The real problem is the underlying injustice, and that cannot be remedied simply by prohibiting a trade in PCAs. So, like the previous two arguments, I conclude that this third argument also fails to provide a convincing case for rationing PCAs.

4. The Initial Distribution Case

The second rationale for a concern with the distribution of PCAs is a desire to ensure that PCAs are introduced into the market in a fair manner. The initial distribution case, unlike the rationing case, has no objection to PCAs being tradable. The task facing those who are moved by this rationale is to identify the norm that should regulate the fair introduction of PCAs into the market. The proposal that has received most attention is the proposal that everyone should be given an equal share of available PCAs.¹⁸ But there are other proposals for introducing PCAs into the market worth examining, and in particular we ought to examine the normative merits of proposals that mirror methods already used, or widely supported, to regulate the distribution of emission rights to states or industrial firms. Insofar as is possible, we should seek normative consistency across the board: if there is a case for using one distributional rule for states or industrial firms then the normative appeals on which that case depends may provide a *prima facie* case for using the same distributional rule for PCAs. Of course it might turn out that the force of the normative appeals does not extend to PCAs because of differences between individuals, states and firms, or that even in the international or industrial case the adopted distributional rules are not in fact justifiable; but only by examining the normative merits of the proposals can we make such a determination.

4.1 Auctioning PCAs

One proposal that is already used to distribute some emission permits to industry under the EU ETS, and which is supported in some civil society groups and think tanks as the best way to distribute permits to industry more widely,¹⁹ is the proposal that governments auction permits. Should auctioning be used to distribute PCAs to individuals? One objection to auctioning PCAs to individuals is that it links access to emission-dependent goods to ability to pay, thereby failing to take advantage of the opportunity that PCAs afford to distribute access to

emission-dependent goods in a more egalitarian manner. A more fundamental objection to auctioning PCAs begins with the observation that, in order to sell something, however the proceeds of the sale are spent, one must enjoy rights to the item sold. Auctioning assumes that governments enjoy such rights: if they do not, then governments can no more auction PCAs than can a thief auction his ill-gotten gains. So *do* governments have rights to PCAs? Certainly, at the international level, it is to governments that emission quotas are allocated. Why shouldn't governments have rights to divide up these quotas and sell them? The important point is that international negotiations are not about giving governments emission quotas for their own use, but for the use of their citizens and industries. Governments are, in this respect, in the position of trustees in charge of a bequest, or a charity in receipt of money intended to help the poor; they are not in the position of the ultimate beneficiaries of the bequest or charitable donation. Quotas are assigned to governments so that they can distribute them fairly among the various claimants within their jurisdiction. They are not assigned to governments so that they can make money by selling them.

The preceding comments demonstrate that the fact that governments are given emission quotas at the international level does not mean that they have any rights over those quotas of the sort that would justify their selling emission rights to their own citizens in the form of PCAs. But the preceding comments do not answer the more fundamental question, *why* should we treat individuals, but not states, as entitled to a share of free emission rights to use or sell as they wish? No easy answer can be given to this question, since it is so closely linked to the foundations of the liberal tradition (which is not to say that all non-liberal ideologies need oppose the free allocation of PCAs to individuals). In short, the liberal tradition begins with individual moral claims and capacities and works upward from these to justify the moral claims and capacities of states. That is why, for example, liberals have invested so much time in trying to justify political authority by reference to individuals' moral capacities and duties.²⁰ When presented with the problem of allocating a new resource like greenhouse gas emission rights, this fundamental liberal commitment requires that we treat individuals as the primary recipients of the resource. Individuals automatically receive entitlements that they can choose to give or sell to the state, not vice versa.²¹ (This argument implies not only that individuals should be given PCAs, but also that when a government sells emission permits to industry, it is in effect selling that which belongs to its citizens and so should either give the proceeds of the sale to its citizens or require their agreement to do otherwise.)

4.2 Grandfathering

A second proposal, known as *grandfathering*, gives more emission permits to those who have historically emitted more greenhouse gases. Grandfathering is used to regulate the allocation of most emission permits to industry under the EU ETS, was adopted in modified form by the Kyoto Protocol (all nations were

required by 2012 to reduce their emissions by an average of five percent from that country's 1990 baseline emissions), and continues to be prominently pushed by big polluters in international negotiations. Although grandfathering is usually framed at the level of firms and countries, one might think that grandfathering should also operate at the level of individuals. The proposal would be that those individuals who have historically benefited from higher greenhouse gas emissions be given more PCAs than those with lower historical emissions. Such a proposal will strike many—and certainly those with egalitarian sympathies—as unjust, just as it may seem unjust in the international or industrial domain. But given the widespread advocacy and adoption of grandfathering in the international and industrial domains, it is important even for opponents of grandfathering that the arguments for grandfathering be accurately stated and dissected in order to provide the strongest case against it.

One argument for grandfathering, made by Meyer and Roser, claims that agents who have used a certain proportion of the earth's atmosphere in the past have *appropriated* that proportion of the earth's atmosphere.²² But this argument depends upon a serious misreading of the Lockean theory of appropriation, in which appropriation depends upon *improving* use rather than *degrading* use. By emitting greenhouse gases into the atmosphere one does not improve but degrades the atmosphere. Such degradation does not, according to the Lockean theory (or any other plausible theory of appropriation), bestow ownership over that proportion of the atmosphere.

A second argument for grandfathering justifies the practice not by *direct* appeal to historical emissions, but by *indirect* appeal to historical emissions, insofar as they serve as evidence for the greater extent to which big emitters *now* require higher greenhouse gas emissions to sustain their carbon-intensive lifestyles. The reason that we should practice grandfathering, the argument goes, is to avoid imposing additional, unfair burdens on those with carbon-intensive lifestyles, who would have to make radical changes to their lifestyles if they are not given more PCAs than other agents. Again, this argument for grandfathering seems extremely implausible when we recall the reason that we need to restrict greenhouse gas emissions at all. We do not need to restrict greenhouse gas emissions because they are becoming a scarce resource. Rather, we need to restrict greenhouse gas emissions because we owe a collective duty to future generations to minimize climatic changes. Past emissions already commit us to climatic changes that will cause a great deal of harm, but if we do not drastically reduce our greenhouse gas emissions then the harm that we will cause will be all the greater. In the face of this, there are no good grounds for complaints by big emitters that they would no longer be able to do what they used to be able to do without extra PCAs. What big emitters used to be able to do (and, indeed, until such time as an appropriate regime of PCAs is implemented, are still able to do) was to enhance their lifestyles at the expense of the victims of climate change, disproportionately contributing to the harm caused by climate change by engaging in indulgent activities. In distributing the burden of responding to our collective duty

drastically to reduce our greenhouse gas emissions, it is quite fair that such indulgences be curtailed first (or at least, that those who wish to continue such enhancement be forced to buy extra PCAs in order to do so). This is the essence of Shue's widely quoted dictum, as applicable to the domestic case as to the international one, that "whatever justice may positively require, it does not permit that poor nations be told to sell *their* blankets in order that rich nations may keep *their* jewellery."²³

4.3 *Equal Allocations*

The most prominent proposal for distributing PCAs is that everyone receive an equal allocation of PCAs. This is the proposal made by the main designers and advocates of PCAs, including Anderson, Bottrill, Fawcett, Fleming, Hillman, Monbiot, and Starkey (cited above). The proposal is mirrored at the international level in the widely supported (except among big polluters) proposal that the emissions of all states should converge on an equal per capita allowance for each state—what Aubrey Meyer calls "contraction and convergence."²⁴ (A variation on this proposal takes into account historical emissions so that, in order to equalize per capita emissions *over time*, including the past, historically high emitters are given lower future allowances.²⁵)

That the equal allocation proposal has received so much support strikes me as an important finding in itself, because the proposal that *all* naturally occurring resources should have been divided up equally—and that compensation is payable by those who received more than their fair share—has never been widely supported. While some egalitarians, most notably left libertarians such as Hillel Steiner, have long advocated this position, the proposal has never been regarded as mainstream.²⁶ But why should atmospheric emission rights be divided up differently to any other naturally occurring resource? If atmospheric emission rights should be divided up equally, then shouldn't other naturally occurring resources also be divided up equally? Perhaps, then, we should now treat the more general egalitarian proposal as mainstream: If so many people think it evident that atmospheric emission rights should initially be shared out equally, there seems to be a strong and widely held intuition in support of the more general egalitarian proposal.²⁷

4.4 *Grandmothering and the Normal-Functioning Approach*

Despite the intuitive appeal of the equal allocations proposal, even several of its main proponents recognize that the proposal doesn't get it *quite* right.²⁸ For the proposal seems unfair when we consider the situation of agents who, as a result of circumstances beyond their control, would require more PCAs than other agents in order to function at some normal level. Where possible, governments might address these sources of unfairness by subsidizing improvements in energy efficiency rather than by handing out extra PCAs: such an approach would be more

sensible in the light of the overall goal of reducing greenhouse gas emissions. Governments might, for example, pay for extra insulation to be installed in poorly insulated homes, thereby enabling those with formerly poorly insulated homes to keep their homes warm without requiring extra PCAs. But it will not always be possible for the government to address these sources of unfairness by subsidizing improvements in energy efficiency. For example, an agent living in a part of the country with a particularly cold climate may need extra emission-dependent energy to keep her house warm, however well insulated the house is. (To qualify her for extra PCAs, let us suppose that her living in this location is the result of unchosen circumstance rather than a deliberate choice.) I will use the term *grandmothering* to denote the practice of giving extra PCAs to agents in such situations.

Some agents who might not be able to achieve a normal level of functioning without extra PCAs might be in a position to buy extra PCAs from those with excess PCAs, in order to achieve a normal level of functioning. Should governments give extra PCAs to these agents, or should they be required to buy their own? Suppose, for example, that the agent who lives in the cold climatic zone could afford to buy extra PCAs in order to keep her house warm, without thereby jeopardizing her ability to satisfy other basic needs or develop other central capabilities. There is no danger that her basic needs or capabilities will not be satisfied, but it will cost her substantially more to do so. The grandmothering intuition suggests that we should indeed give the agent extra PCAs, so that she can keep her house warm at a similar cost to other agents. It would be unfair to require the agent to buy extra PCAs for herself. So the intuition that justifies grandmothering is not merely that agents should not be prevented by circumstances beyond their control from achieving a normal level of functioning, but that they should be able to achieve a normal level of functioning at a similar cost to other agents. (The extra PCAs given to these agents need not, however, mean an increase in the overall national cap, because the extra PCAs given to these agents could be offset by giving slightly fewer PCAs to all other agents.)

The intuition that we should practice grandmothering suggests that the proposal to equalize PCAs does not quite do justice to our underlying moral commitments. But what are those underlying moral commitments? And how should we clarify the meaning *normal functioning*? One way to interpret *normal functioning* would be by reference to an objective list of basic needs or capabilities. I argued above that one version of a commitment to an objective list of basic needs or capabilities could require us to prohibit a trade in PCAs. But such a prohibition only follows if one's commitment to satisfying needs or developing capabilities extends even to cases in which agents would rather pursue other desires at the expense of their basic needs or capabilities. One might defend instead an alternative version of the commitment to basic needs or capabilities, according to which agents should have the option to satisfy their basic needs or develop their central capabilities, but need not be bound to do so. Such a commitment would not require us to prohibit a trade in PCAs, but it would require us to ensure that agents either

have enough PCAs, or have the funds to buy enough PCAs, to ensure that they can satisfy basic needs or develop central capabilities *if they choose to do so*.

One problem with the basic needs or capabilities approach is that the approach provides no grounds for concern if an agent can satisfy basic needs or develop central capabilities, but only at a significantly greater cost than other agents. Yet the grandmothering intuition required that agents should be able to achieve a normal level of functioning *at a similar cost to other agents*. The basic needs or capabilities approach fails to account for this aspect of the intuition. The approach requires us only to ensure that agents can satisfy basic needs or develop their central capabilities, but not to ensure that they can do so at the same cost as other agents.

The second reason that the basic needs or capabilities approach is unsatisfactory is that it cannot account for intuitions about how any additional PCAs should be shared out, once those required for the satisfaction of basic needs or the development of central capabilities have already been shared out. Given the scale of emission reductions required to avert the worst consequences of climate change, one might think that governments should set national emissions caps at a level that will ensure that no further PCAs *will* be available once those necessary for the satisfaction of basic needs or the development of central capabilities have been given out. But suppose that caps are set at a higher level, and that extra PCAs are available. The basic needs or capabilities approach has nothing to say about how the extra PCAs should be distributed. But it seems to me that we should still care about how these PCAs are distributed: They should be distributed *fairly*, according to some criterion of fairness not explained by the basic needs or capabilities approach.

More plausible than the basic needs or capabilities interpretation of the normal-functioning approach is a luck-egalitarian interpretation. Luck-egalitarianism requires us to equalize the effects of unchosen circumstance on agents' opportunities for welfare.²⁹ As such, it understands normal functioning not in terms of an objective list, but by comparison with the situation of other agents. According to the luck-egalitarian interpretation of the normal-functioning approach, *we should ensure that PCAs are distributed so that, insofar as is possible, the distribution does not affect any agent's opportunities for welfare any more or less than other agents, as a result of circumstances beyond the agent's control*.³⁰ In practice this would mean, roughly, that agents for whom activities important to their welfare are, as a result of unchosen circumstance, more carbon intensive, would need to receive more PCAs than agents for whom activities important to their welfare are less carbon intensive. These differences might arise because the same activity is differentially carbon intensive for two agents in different circumstances—keeping a house warm in a hot climate and a cold climate for example. Or they might arise because different agents need to perform different activities or different levels of activity in order to achieve the same level of welfare—a younger person, for example, might be able to get around town (to go to work, to visit friends and family) with a bicycle, whereas an older person

might need access to some form of motorized transport.³¹ Clearly there are difficulties in determining when an agent's situation is the result of choice and when it is the result of unchosen circumstance. These difficulties are a matter for ongoing discussion in the wider literature on luck-egalitarianism, and not difficulties that we can hope to address satisfactorily here. But while such difficulties will need to be addressed in order to actually implement a luck-egalitarian distribution of PCAs, they need not interfere with the present project of *defending* a luck-egalitarian distribution of PCAs. That the line between choice and unchosen circumstance is not always clear implies neither that we should reject the distinction nor that the distinction does not have the normative relevance claimed for it.

As well as enjoying the theoretical support of luck-egalitarianism, this interpretation yields intuitively plausible results that overcome the difficulties associated with the basic needs or capabilities interpretation of the normal-functioning approach. It can explain the intuition that agents should not be prevented by circumstances beyond their control from achieving a normal level of functioning *at a similar cost to other agents*, since the opportunities for welfare of an agent who has to pay to purchase additional PCAs would be adversely affected by her financial loss. It also provides a distributive principle that applies both to PCAs required for subsistence, and to additional PCAs not required for subsistence. Finally, the luck-egalitarian interpretation allows us to achieve consistency between the normative principle informing decisions about initial allocations of PCAs, and the normative principle informing decisions about carbon accounting. Recall that in the case of carbon accounting—working out how many PCAs an agent need surrender to purchase a particular emission-dependent good—I suggested that we ought to require agents to surrender more PCAs for *choosing* to take a more carbon-intensive option than a less carbon-intensive one, but not for being given a more carbon-intensive option for reasons beyond their control. Adopting a choice-sensitive but circumstance-insensitive approach both to the initial allocation of PCAs and to carbon accounting allows us to capitalize on the environmentally beneficial incentives of a system of PCAs while remaining faithful throughout to the demands of luck-egalitarian justice.

5. Conclusion

I have argued that we should initially allocate PCAs in a manner that ensures, insofar as is possible, that the distribution does not affect any agent's opportunities for welfare any more or less than other agents, as a result of circumstances beyond the agent's control. Once PCAs have been allocated, agents should then be free to sell their PCAs or to buy more PCAs as they wish. In practice, of course, any distribution of PCAs will only be an approximation to this ideal. But practical difficulties do not impugn the moral value of the distributive principle itself, and an approximation to an ideal is still a better outcome than complete disregard for the ideal. There is, of course, a trade-off here between simplicity and justice. From a policy perspective, it is tempting to say that, in order to keep the system simple, we

should allocate PCAs equally despite the injustices that will arise if we do so. But I doubt that we need to go so far in prioritizing simplicity over justice. Simplicity is only of value here insofar as it helps the system to run smoothly and transparently, so that administrative costs are kept down and so that the public understand the system and regard it as fair. We will undoubtedly have to compromise justice to some extent for the sake of these ends, but we need not pessimistically assume that any variation on equal allocations will prevent their achievement.

So, how should governments that adopt a system of PCAs proceed? Perhaps the best way to proceed would be initially to distribute PCAs equally, but to hold some PCAs back for agents who submit successful applications for additional PCAs on the grounds of their unchosen exceptional circumstance. Such a system would throw up not insignificant problems: the need to set clear criteria for unchosen exceptional circumstance; the need to win public support for a system of PCAs in general and for this distribution in particular; the need to design and implement a system for fairly assessing applications from those claiming unchosen exceptional circumstance. Any system initially more complex than this would indeed run the risk of condemning the whole system of PCAs to failure from the start. But the suggested system could be improved over time, both in order to take account of more minor variations in circumstance-attributable emission requirements, and in order to identify not only agents who have *greater* than average circumstance-attributable emission requirements, but also agents who have *smaller* than average circumstance-attributable emission requirements. So once the system was up and running, governments might seek to develop more sophisticated methods for assessing agents' circumstance-attributable emission requirements. But they should not rush to do so. By waiting a few years before developing such methods, governments would have the considerable advantage not only of having addressed initial problems and let the system settle down, but also of having access to a wealth of information about the use of PCAs thus far, which could usefully inform the development of new methods for assessing circumstance-attributable emission requirements.

For helpful comments I would like to thank Paula Casal, Tim Hayward, Rob Lamb, Andrew Williams, and two anonymous reviewers.

Notes

¹For more detail on the subtle differences between these schemes, see Catherine Bottrill, "Understanding DTQs and PCAs," ECI Working Paper (2006), <http://www.eci.ox.ac.uk/research/energy/downloads/pct/dtq-and-pca.pdf> (accessed September 24, 2008); and Simon Roberts and Joshua Thumim, *A Rough Guide to Individual Carbon Trading: The Ideas, the Issues and the Next Steps*, Centre for Sustainable Energy report to Defra (2006), <http://www.cse.org.uk/pdf/news1270.pdf> (accessed September 24, 2008).

²Cf. Paul Baer, "Equity, Greenhouse-Gas Emissions, and Global Common Resources," in *Climate Change Policy: A Survey*, ed. Stephen H. Schneider, Armin Rosencranz and John O. Niles (Washington, DC: Island Press, 2002), 393–408, at 401.

- ³David Fleming, *Paper 11—Tradable Quotas: Setting Limits to Carbon Emissions* (London: The Lean Economy Initiative, 1997); David Fleming, “Tradable Quotas: Using Information Technology to Cap National Carbon Emissions,” *European Environment* 7 (1997): 139–48; David Fleming, *Energy and the Common Purpose: Descending the Energy Staircase with Tradable Energy Quotas (TEQs)*, 3rd ed. (London: The Lean Economy Connection, 2007), <http://www.teqs.net/book/teqs.pdf> (accessed September 24, 2008).
- ⁴Richard Starkey and Kevin Anderson, “Domestic Tradable Quotas: A Policy Instrument for Reducing Greenhouse-Gas Emissions from Energy Use,” Tyndall Centre for Climate Change Research: *Technical Report* 39 (2005), http://www.tyndall.ac.uk/research/theme2/final_reports/t3_22.pdf (accessed September 24, 2008).
- ⁵Mayer Hillman and Tina Fawcett, *How We Can Save the Planet* (London: Penguin, 2004); George Monbiot, *Heat: How We Can Stop the Planet Burning* (London: Penguin, 2007).
- ⁶On the UK government position, for example, see Tina Fawcett, Catherine Bottrill, Brenda Boardman, and Geoff Lye, *Trialling Personal Carbon Allowances*, UKERC Research Report (2007), <http://www.eci.ox.ac.uk/research/energy/downloads/fawcett-pca07.pdf>; and <http://www.defra.gov.uk/environment/climatechange/uk/individual/carbontrading/index.htm> (both accessed September 24, 2008).
- ⁷Survey conducted by the Institute for Public Policy Research (IPPR)—see IPPR press release, “IPPR Says Public More Receptive to Personal Carbon Trading than Policy Makers Believe,” 16 July 2008, <http://www.ippr.org.uk/pressreleases/?id=3208> (accessed September 24, 2008).
- ⁸<http://www.rsacarbonlimited.org/> (accessed September 25, 2008).
- ⁹See Raymond J. Kopp, “CO₂ Emissions—Taxes or Permits? Raymond J. Kopp asks whether U.S. Climate Policy Should Be Based on Taxes or Permits,” *Oxford Energy Forum* 38 (August 1999): 14–16.
- ¹⁰For example, Roberts and Thumim, *A Rough Guide*, 8.
- ¹¹In the UK, for example, household energy and personal transport accounts for fifty percent of national greenhouse gas emissions, or forty percent without aviation and public transport.
- ¹²Steve Vanderheiden, *Atmospheric Justice: A Political Theory of Climate Change* (Oxford: Oxford University Press, 2008): 222–23. Vanderheiden’s point is directed at the international context, but it applies also to the domestic context.
- ¹³See Martha C. Nussbaum, *Women and Human Development: The Capabilities Approach* (Cambridge: Cambridge University Press, 2000).
- ¹⁴Michael Sandel, ed., “Should We Buy the Right to Pollute?” chap. 14 in *Public Philosophy* (Cambridge, MA: Harvard University Press), 93–96, at 94. Goodin makes similar arguments in Robert E. Goodin, “Selling Environmental Indulgences,” chap. 17 in *Debating the Earth: The Environmental Politics Reader, Second Edition*, ed. John S. Dryzek (Oxford: Oxford University Press, 2005), 239–56, although his arguments are levelled not only at a trade in emission permits, but at any system that legitimizes emissions for a price, including taxes and non-tradable permits.
- ¹⁵A stronger argument for prohibiting a trade in PCAs can be made if, instead of treating agents as being under a *collective* responsibility to reduce aggregate emissions, one instead argues that everyone is under an *individual* duty to reduce their own emissions in order to avoid harming potential victims of climate change, regardless of what other agents are doing. Such a position provides a stronger grounding for a prohibition on trading PCAs, but it does so at the considerable cost of demanding unrealistically high reductions in individuals’ greenhouse gas emissions. As Vanderheiden (*Atmospheric Justice*, 162) argues, since any emissions generate increases, however small, in the likelihood that potential victims of climate change will be harmed, “the upshot is a ban on nearly all human activity, including the exhaling of CO₂, insofar as such acts release greenhouse gases into the atmosphere.” (I suspect that a case could be made for exempting at least those activities necessary to sustain life, but it is nevertheless true that the implications of prohibiting all non-life-sustaining greenhouse gas emissions would still be immense.) Whatever the moral merits of this position, which depend on involved issues about responsibility for aggregate harms, they are beyond the scope of the present discussion. In considering how to

distribute PCAs—or for that matter how to distribute industrial permits or set environmental taxes—we are already committed to treating the problem as one of sharing out the burden of discharging a collective responsibility rather than enforcing individual duties to the potential victims of climate change. Whether the decision to treat the problem this way is based on moral reasons or policy reasons, it entails rejection of the individual-duty case against trading PCAs. Note, however, that for policy reasons one might *treat* the problem in terms of distributing a collective responsibility while still maintaining that the problem ought, morally, to be analyzed in terms of individual duties drastically to reduce one's own personal emissions. As Goodin ("Selling Environmental Indulgences," 252) writes, "Environmentalists ought to be realists. They ought not go tilting at windmills; they ought not let the best be the enemy of the good; they ought get what they can, here and now, rather than holding out in all-or-nothing fashion when doing so only guarantees that nothing will be achieved."

¹⁶ Henry Shue, "Subsistence Emissions and Luxury Emissions," *Law and Policy* 15 (1993): 39–59; see also Henry Shue, "Climate," in *A Companion to Environmental Philosophy*, ed. Dale Jamieson (Oxford: Blackwell Publishing, 2001), 449–59. Shue allows that additional emission rights beyond those required for subsistence could be made available for trading. For additional arguments against Shue's position, see Stephen Gardiner, "Ethics and Global Climate Change," *Ethics* 114 (2004): 555–600, at 585–86.

¹⁷ Shue, "Climate," 455.

¹⁸ See, for example, publications cited above by Anderson, Bottrill, Fleming, Fawcett, Hillman, Monbiot, and Starkey.

¹⁹ For example, Tim Gibbs and Simon Retallack, *Trading Up: Reforming the European Union's Emissions Trading Scheme* (London: IPPR, 2006), <http://www.ippr.org.uk/publicationsandreports/publication.asp?id=513> (accessed September 25, 2008).

²⁰ For an overview of these efforts, see Keith Hyams, "Political Authority and Obligation," chap. 1 in *Issues in Political Theory*, ed. Catriona McKinnon (Oxford: Oxford University Press, 2008), 9–32.

²¹ Peter Barnes, *Who Owns the Sky?* (Washington, DC: Island Press, 2001), 53–54, offers three answers to the question "why should individuals be treated as the primary recipients of atmospheric rights?", all of which seem to me to be grounded in the fundamental liberal commitment to moral individualism. Also relevant is Pogge's more practical point that by allowing governments to control resources on behalf of their populations—what Pogge calls the *resource privilege*—we create incentives for political instability and corruption in developing countries. Thomas Pogge, *World Poverty and Human Rights: Cosmopolitan Responsibilities and Reforms, Second Edition* (Cambridge: Polity Press, 2008), 119–20.

²² Lukas H. Meyer and Dominic Roser, "Distributive Justice and Climate Change: The Allocation of Emission Rights," *Analyse und Kritik* 28 (2006): 223–49.

²³ Henry Shue, "The Unavoidability of Justice," in *The International Politics of the Environment*, ed. Andrew Hurrell and Benedict Kingsbury (Oxford: Oxford University Press, 1992), 373–97, at 397. Quoted by: Michael Grubb, "Seeking Fair Weather: Ethics and the International Debate on Climate Change," *International Affairs* 71 (1995): 463–96, at 478; Matthew Paterson, "International Justice and Global Warming," in *The Ethical Dimensions of Global Change*, ed. Barry Holden (Basingstoke: Macmillan Press, 1996), 181–201, at 183; E. Wesley and F. Peterson, "The Ethics of Burden-Sharing in the Global Greenhouse," *Journal of Agricultural and Environmental Ethics* 11 (1999): 167–96, at 187; Stephen M. Gardiner, "Ethics and Global Climate Change," *Ethics* 114 (2004): 555–600, at 578.

²⁴ For example, Anil Agarwal and Sunita Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* (New Delhi: Centre for Science and Environment, 1991); Dale Jamieson, "The Epistemology of Climate Change: Some Morals for Managers," *Society and Natural Resources* 4 (1991): 319–29; Michael Grubb, Jame Sebenius, Antonia Magalhaes, and Susan Subak, "Sharing the Burden," in *Confronting Climate Change: Risks, Implications, and Responses*, ed. Irvin M. Mintzer (Cambridge: Cambridge University Press, 1992), 305–22; Aubrey Meyer, *Contraction and Convergence: The Global Solution to Climate Change*, Schumacher

Briefing No. 5 (Dartington: Green Books, 2000); Paul Baer, John Harte, Barbara Haya, Antonia V. Herzog, John Holdren, Nathan E. Hultman, Daniel M. Kammen, Richard B. Norgaard, and Leigh Raymond, "Equity and Greenhouse Gas Responsibility," *Science* 289 (2000): 2287; Paul Baer, "Equity, Greenhouse-Gas Emissions," 393–408; Tom Athanasiou and Paul Baer, *Dead Heat: Global Justice and Global Warming* (New York: Seven Stories Press, 2002); Peter Singer, ed., "One Atmosphere," chap. 2 in *One World: The Ethics of Globalization* (New Haven, CT: Yale University Press, 2002).

²⁵ See Singer, "One Atmosphere," 43–44; Baer, "Equity, Greenhouse-Gas Emissions," 402.

²⁶ Hillel Steiner, *An Essay on Rights* (Oxford: Blackwell, 1994).

²⁷ Vanderheiden (*Atmospheric Justice*, 103–104) argues that there is a stronger case for an egalitarian distribution of atmospheric emission rights than there is for other resources, because the atmosphere transcends national boundaries and is not therefore subject to competing property claims from those states in whose territory other resources lie. This is not to say that the national property claims should always take precedence over other considerations, but only that a stronger argument—Vanderheiden looks at the argument from an international Rawlsian original position to a "resource redistribution principle" made by Charles R. Beitz, *Political Theory and International Relations* (Princeton: Princeton University Press, 1979)—must be given for redistributing resources between nations, than that required to justify an egalitarian allocation of a hitherto unowned supranational resource. This distinction seems to me difficult to maintain. It is not enough, to maintain the distinction, that nations *claim* ownership rights over natural resources in their territory. Rather, the distinction requires that these claims be morally justified. But if one endorses the view that unowned, supranational resources like the atmosphere should be distributed in an egalitarian fashion, then there is a *prima facie* case for rejecting as morally unjustified the claims made by nations over natural resources in their territory. All resources were once unowned and supranational (or at least, before nations existed, extranational), and as such should have been allocated in accordance with the same egalitarian distributive criteria that apply to the atmosphere. Since they were not, we ought to conclude that existing claims to national ownership of resources derive from unjust methods of appropriation, and are not therefore morally justified.

²⁸ For example, Hillman and Fawcett, *How We Can Save the Planet*, 127; Starkey and Anderson, "Domestic Tradable Quotas," 11–14; Tina Fawcett, "Making the Case for Personal Carbon Rations," *Proceedings of European Council for an Energy Efficient Economy Summer Study—What Works and Who Delivers?* (2005): 1483–93, at 1491, <http://www.eci.ox.ac.uk/research/energy/downloads/fawcett-pct05.pdf> (accessed September 27, 2008); Fleming, *Energy and the Common Purpose*, 31; Monbiot, *Heat*, 47–48. For a detailed breakdown of the distributional impacts of giving everyone an equal PCA allocation, see Joshua Thumim and Vicki White, *Distributional Impacts of Personal Carbon Trading*, Centre for Sustainable Energy report to Defra (2008), <http://www.defra.gov.uk/environment/climatechange/uk/individual/carbontrading/pdf/pct-distributional-impacts.pdf> (accessed September 23, 2008).

²⁹ Ronald Dworkin, *Sovereign Virtue* (Cambridge, MA: Harvard University Press, 2000), chaps. 1, 2, and 7; G. A. Cohen, "On the Currency of Egalitarian Justice," *Ethics* 99 (1989): 906–44.

³⁰ Vanderheiden (*Atmospheric Justice*, 226–27) endorses a similar position at the level of national emission allocations, which he calls a "modified equal shares approach." Vanderheiden writes that "differences in circumstance that lie outside of an agent's control can form the basis for valid claims for unequal resources, and must do so insofar as these affect opportunities for welfare" (p. 227). There are two respects, however, in which the present position is more faithful to the wider luck-egalitarian theory of justice than the position endorsed by Vanderheiden. First, by applying luck-egalitarian criteria to the distribution of PCAs rather than national emission allocations, the present position recognizes that luck-egalitarian distributive criteria are intended, at the moral level, to describe what is owed to individual agents rather than to larger moral units such as nations. Second, the present position endorses *only* luck-egalitarian criteria for the distribution of PCAs, whereas Vanderheiden's modified equal shares approach also endorses need-based reasons for departing from equality: "the portion of available global emissions to be subject

to egalitarian distribution ought to be luxury emissions, not total emissions” (p. 226). But luck-egalitarian and need-based distributive criteria do not combine comfortably in a unified moral theory, one being a historical distributive principle and the other a patterned distributive principle. Perhaps these two problems are linked: when luck-egalitarian criteria are applied to states rather than individuals, the conclusion that states that make bad decisions should be left to suffer seems unpalatable, precisely because states are not unitary agents in the way that individuals are. Rather, the citizens who will suffer most within states that make bad decisions are unlikely to be the same citizens who make the bad decisions. In order to protect these vulnerable citizens, it seems necessary to supplement luck-egalitarian criteria for the distribution of emission quotas between states with need-based criteria, even though the latter are unnecessary in the domestic context.

- ³¹Can one say, for example, that “I need extra PCAs so that I can continue to fly to Barbados for my holidays. You might be content with the seaside resort up the road, but I can only achieve a similar level of welfare if I go to Barbados”? This raises the problem—usually couched in monetary terms but equally problematic for emission requirements—that Dworkin (*Sovereign Virtue*, 48) has dubbed *expensive tastes*. The answer depends, of course, on how one draws the distinction between choice and circumstance (Dworkin draws the distinction so that all expensive tastes fall on the choice side; Cohen in “On the Currency” and in G. A. Cohen, “Expensive Taste Rides Again,” in *Dworkin and His Critics*, ed. J. Burley (Oxford: Blackwell, 2004), 3–29, draws the distinction so that some expensive tastes fall on the choice side and some on the circumstance side). Only if it is really a matter of circumstance rather than choice (e.g., a choice to foster the taste for Barbados) that you need Barbados whereas I am content with the seaside resort up the road would you have any case for extra permits, and that seems unlikely on most plausible versions of the distinction. Furthermore, even if you do need your holiday in Barbados in order to achieve the same level of welfare that I can achieve in the local seaside resort, nothing in the luck-egalitarian interpretation of the normal-functioning approach automatically entitles either of us to our holiday, if the overall emissions cap cannot accommodate such peripheral opportunities for welfare. More likely to earn serious consideration, perhaps, are cases of so-called “love miles,” where an agent lives far from close members of his family and needs to fly to see them. Mayer Hillman (*How We Can Save the Planet*, 142–43) rejects any claim for additional permits for such agents, but the luck-egalitarian normal-functioning approach might be more sympathetic, provided that an agent’s situation is the result of circumstance rather than choice, and that his welfare would suffer sufficiently if he doesn’t see his family. The choice–circumstance distinction may throw up particularly thorny issues in such cases. For example, is it a matter of choice or circumstance that a naturally intelligent and ambitious Angolan pursues an academic career in the United States and needs to fly back to Angola to see her family? It was her choice to go to the United States, but it was a matter of circumstance that she was naturally intelligent and ambitious, and that the universities in the United States were better than those in Angola.

1. the global climate change crisis and the inadequacy of historical efforts to combat global warming . 9 A. Overview of the Global Climate Change Crisis . 9 B. The Inadequacy of Historical Efforts to Address Greenhouse Gas Emissions and Global Warming .Â The global climate change crisis calls for innovation from in-dustry to meet the challenge of carbon dioxide emissions reduc-tions and promote the development of alternative energy sources. It is essential that the United States and the world take strong and decisive action to reduce greenhouse gas emissions.Â A more efficient and effective market-based approach to re-duce carbon dioxide emissions would be a carbon tax imposed on. Although climate change agreements emphasising carbon emission reduction have been reached through international approaches, the policy measures to meet the obligations and objectives set by such agreements have been implemented at the national or regional level. Here they are supplemented by policy instruments such as efficiency standards and incentives to invest in infrastructure which does not give rise to carbon emissions.Â This was due to the entrenched anti-nuclear position of some of the environment NGOs lobbying at the negotiations and the tendency for national delegations to be dominated by those from Environment Departments, with a historically more negative position towards nuclear energy than their overall national position. A useful bibliography on personal carbon allowances and related ideas is available in Fleming (2007). Is the UK preparing for â€œwarâ€? Military metaphors, personal carbon allowances, and consumption rationing in historical perspective.Â Prospects for an effective global response. In: Energyâ€”the changing climate. London: Stationery Office, 2000:47-61. www.rcep.org.uk/newenergy.htm (accessed 18 May 2006). Hard to swallow Guardian (Society): 9. 16 Building for health: capital sustainability.Â A carbon footprint is the sum of greenhouse gas emissions (GHGEs) associated with food production, processing, transporting, and retailing. We examined the relation between the energy and nutrient content of foods and associated GHGEs as expressed as g CO2 equivalents.