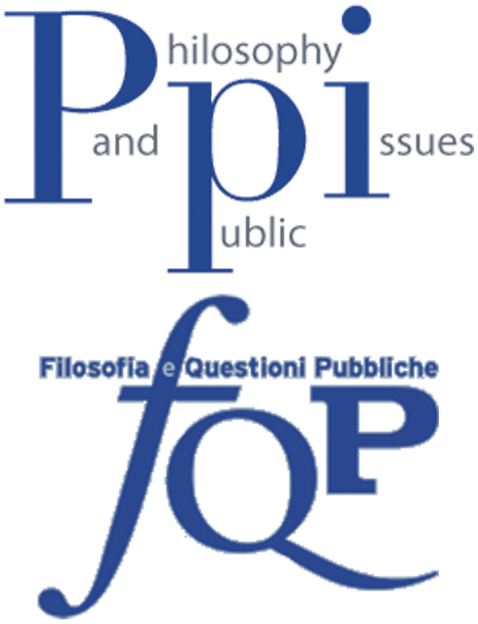
SYMPOSIUM

A CHANGING MORAL CLIMATE



THE INDIVIDUAL'S OBLIGATION TO RELINQUISH UNNECESSARY GREENHOUSE-GAS-EMITTING DEVICES

BY JOHN NOLT

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The Individual's Obligation to Relinquish Unnecessary Greenhouse-Gas-Emitting Devices

John Nolt

Abstract. The use of many common devices requires the emission of greenhouse gases. Examples include internal combustion engines, most heating and cooling devices, and anything that uses electrical power some of which is generated by the burning of fossil fuels. Most current schemes for reducing greenhouse gas emissions take it for granted that individuals will continue using such devices. These schemes aim, for example, to sequester the emissions or switch the energy source to wind, solar or nuclear power. But this paper contends that the potential harm of global climate change is so great and the need for emissions reduction so urgent that where the use of greenhouse-gas-emitting devices is *unnecessary* (that is, eliminable without violating overriding moral obligations), we have a moral obligation simply to stop using them.

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I

Introduction

The use of many common devices requires the emission of greenhouse gases. Examples include internal combustion engines, most heating and cooling devices, and anything that uses electrical power some of which is generated by the burning of fossil fuels. Most current schemes for reducing greenhouse gas emissions take it for granted that individuals will continue using such devices. These schemes aim, for example, to sequester the emissions or switch the energy source to wind, solar or nuclear power. But this paper contends that the potential harm of global climate change is so great and the need for emissions reduction so urgent that where the use of greenhouse-gas-emitting devices is *unnecessary* (that is, eliminable without violating overriding moral obligations), we have a moral obligation simply to stop using them.

The argument for this claim is as follows:

1. The harms of greenhouse gas emissions are so great and continue over such a long time that even the emissions of single individuals contribute significantly to the bodily harm of others.

2. Many uses by individuals of greenhouse-gas-producing devices are unnecessary.

3. In most cases, such devices cannot soon be powered in ways that do not produce greenhouse gases.

4. One may not contribute significantly and unnecessarily to the bodily harm of others.

So

5. We are morally obligated to not to use such devices unnecessarily.

My presentation is divided into three parts. §II lays out and defends the premises of this argument. §III considers and responds to objections. §IV discusses strategies for eliminating unnecessary uses of greenhouse-gas-producing devices.

A word about scope: this paper is concerned exclusively with individual obligations to refrain from using these devices. I hold, of course, that individuals also ought to support political efforts to mitigate climate change. And I recognize that the obligations of individuals pale beside those of corporations and governments. Still, I will consider here only what an individual ought to do (or refrain from doing), for (as I hope to show) her personal greenhouse gas emissions are also morally important.

II

The Argument

This part explains and defends each of the argument's premises.

Premise 1: The Harms of Small Emissions

According to premise 1, the harms of greenhouse gas emissions are so great and continue over such a long time that even the emissions of single individuals contribute significantly to the bodily harm of others. The argument for this premise, in a

nutshell, is as follows. The already considerable global harm per unit time (e.g., per year) from humanity's current and historic greenhouse gas emissions is increasing and will continue for centuries. Its degree depends directly and continuously on global average temperature. But global average temperature over the coming centuries depends in turn directly and continuously on cumulative total CO_2 emissions. Therefore, even small emissions, such as those of individuals, contribute significantly to the cumulative total harm. A more detailed explanation follows.

Consider first that the harm from humanity's greenhouse gas emissions is already great. This is because we have already made the atmosphere and oceans hotter than is optimal for both human and non-human life. According to the World Health Organization, "Global warming […] caused over 140,000 excess deaths annually by the year 2004."[1] A 2009 study by the Global Humanitarian Forum (a United Nations affiliate) estimated the current death toll from climate change at 300,000 people annually, nearly all of them in developing nations.[2] A 2012 report by Development Assistance Research Associates puts the current annual death toll from climate change at 400,000 (nearly all in developing nations) and projects that by 2030 it will rise to nearly 700,000.[3] One may dispute the details of these estimates, but the fact that climate change is already causing large numbers of

[1] World Health Organization, "Climate change and health" fact sheet, October 2012, accessed July 4, 2013, http://www.who.int/mediacentre/factsheets/fs266/en/index.html.

[2] "Climate Change: The Anatomy of a Silent Crisis," Global Humanitarian Forum, 2009, accessed January 14, 2013, http://www.ghf-ge.org/human-impact-report.pdf.

[3] "Climate Vulnerability Monitor," 2nd ed.,"Development Assistance Research Associates (DARA), 2012, accessed January 14, 2013, http://daraint.org/climate-vulnerability-monitor/climate-vulnerability-monitor-2012/report/.

human deaths is beyond doubt—as is the fact that the death rate is increasing.

The Intergovernmental Panel on Climate Change (IPCC) warns that "climate change over the next century is *likely* to adversely affect hundreds of millions of people through increased coastal flooding, reductions in water supplies, increased malnutrition and increased health impacts."[4] These adverse effects include sickness, injury and death. Moreover such harms will not be confined just to the next century.[5] Elsewhere I have argued that the number of people "adversely affected" by climate change during the next millennium will be in the billions.[6]

The effects of anthropogenic climate change on non-human life will also be profound, but consideration of bodily harm to humans alone suffices, I think, to make a strong case for eliminating unnecessary uses of greenhouse gas devices. Since it also yields an elegantly simple argument, it is the strategy I will follow here.

Though the mechanisms of these bodily harms are various, nearly all hinge in one way or another on rising temperatures. Moreover, global average temperature is directly influenced by humanity's greenhouse gas emissions. When released into the atmosphere, greenhouse gases absorb and retain heat that would otherwise be radiated into space. Each molecule of a greenhouse gas has, individually, the capacity to retain some of this heat. It follows that, other things being equal, any increase in the

[4] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Synthesis Report* (Cambridge: Cambridge University Press, 2007), 65.
[5] IPCC, *Climate Change 2007: Synthesis Report*, 47.
[6] John Nolt, "How Harmful Are the Average American's Greenhouse Gas Emissions?" *Ethics, Policy and Environment* 14, (2011), 3-10; and John Nolt, "Replies to Critics of 'How Harmful Are the Average American's Greenhouse Gas Emissions?'" *Ethics, Policy and Environment* 16, (2013), 111-119.

atmospheric greenhouse gas content raises, however slightly, the global average temperature.

Furthermore, elevated heat retention persists for however long a portion of the emitted gas remains in the atmosphere. In the case of carbon dioxide the time is long indeed. In a recent comprehensive review of the literature on the atmospheric lifetime of fossil fuel carbon dioxide, Archer, et. al., found that "The models agree that 20–35% of the CO_2 remains in the atmosphere after equilibration with the ocean (2–20 centuries)."[7] Suppose, then, that a person emits a quantity of CO_2 today. The additional quantity will immediately begin contributing to global heat retention. Over time, some will be removed from the atmosphere, chiefly by being dissolved in the oceans (where, incidentally, it will contribute to acidification). But a substantial portion will remain in the atmosphere for centuries, continually contributing to the warming of the atmosphere and hence of the land and oceans. Therefore, other things being equal, any given CO_2 emission contributes to increased global average temperature, not just in the following years or decades, but for centuries.

Of course, other things are not equal. Global average atmospheric temperature is also affected by many other variables, including volcanic activity; solar irradiance; feedback loops (as when methane, a greenhouse gas, is released from melting tundra); and short-term exchanges of CO_2 and heat between oceans or vegetation and the atmosphere. Therefore, atmospheric temperature increases due to increased CO_2 concentrations can for a time be masked by these other phenomena. That is why the plot of global average temperature over the last few decades (whether measured in the atmosphere, the oceans, or both) is a

[7] David Archer, *et. al.*, "Atmospheric Lifetime of Fossil Fuel Carbon Dioxide," *Annual Review of Earth and Planetary Sciences* 37 (2009), 117.

jagged but steadily rising line. Were it possible to hold these other variables constant, the jaggedness would disappear. Global average atmospheric temperature would in theory rise smoothly and continuously with atmospheric CO_2 concentration. This follows almost immediately from the fact that retention of heat (a form of kinetic energy) increases directly with atmospheric CO_2, together with the law of conservation of energy.

The duration of excess CO_2 in the atmosphere has an important implication regarding emissions: global average temperature over the coming centuries will be largely insensitive to their rate and timing, being strongly correlated instead with their cumulative total.[8] Thus it doesn't matter much when and at what rate we and our immediate successors emit CO_2. What matters is how much we emit.

The degree to which global average temperature depends on carbon concentrations is only approximately known. According to the IPCC, the long-term global average temperature increase for a doubling of the CO_2 concentration is "*likely* to be in the range of 2 to 4.5°C with a best estimate of about 3°C, and is *very unlikely* to be less than 1.5°C. Values substantially higher than 4.5°C cannot be excluded, but agreement of models with observations is not as good for those values."[9] Given that a doubling of the CO_2 concentration is necessary to raise the temperature, say 3°C, then to raise it 6°C, four times that concentration is needed, to raise it 9°C, eight times that concentration is needed, and so on. Each additional increment of CO_2 therefore produces a somewhat smaller increase in

[8] Myles R. Allen, *et. al.*, "Warming Caused by Cumulative Carbon Emissions towards the Trillionth Tonne," *Nature* 458 (2009), 1163-6. It may also be possible to control global temperature by geo-engineering, which is discussed briefly below.

[9] IPCC, *Climate Change 2007: Synthesis Report*, 38.

temperature. It would be a mistake, however, to infer that each additional increment produces a smaller increase in harm, for we have yet to consider how harm depends on temperature.

Certain features of this dependency are readily apparent. Given that the world is already overheated, harm obviously increases with temperature. This is true whether harm is aggregated per unit time (per year, for example) or as a cumulative total that includes all the bodily harms attributable to anthropogenic climate change for however long they last.[10]

Moreover (and this is crucial for what follows) the increase of harm with temperature is more or less continuous. This is because, except when it takes the form of death, harm is generally a matter of degree. A little more heat in a drought, for example, incrementally decreases crop yields and water availability, thus incrementally increasing hunger, thirst and the health effects thereof. A slight rise in the velocity of heat-driven storm winds slightly increases the severity of resulting injuries. The number of instances of harm (*per annum*, let's say) is, moreover, already large. Since injuries and harms of deprivation are continuously variable in severity, bodily harm *per annum* must also rise more or less continuously with global average temperature. But (leaving aside the confounding variables mentioned above) global average temperature itself rises smoothly and continuously with cumulative emissions. Therefore, cumulative harm (over, say the next millennium) increases more or less continuously with cumulative total emissions. It follows that even small CO_2 emissions increase total harm.

[10] It is doubtful that all these kinds of harm are comparable. If so, aggregation might require partitioning them into categories of comparable harms. My claim would then be that harms in each of these categories increase monotonically and more or less continuously as temperatures increase.

It seems quite likely, furthermore, that harms increase more than proportionally to temperature increases—at least until life on Earth becomes severely depleted. There are various reasons for this. Perhaps the most general is that the tolerable temperature ranges for populations of humans, livestock, crops, and other organisms on which humans depend (including those that supply ecosystem services), tend to exhibit a normal distribution—that is, a bell curve. Moving from the center toward the high-temperature end of such ranges at first produces little harm, but then, precipitously, accelerating harm, followed (when nearly all possible harm has been done) by a decelerated decline to extinction.[11]

Given these considerations, how small an emission, then, can contribute significantly to harm? The emissions of single individuals, even those of affluent individuals, are, of course, comparatively miniscule. Whatever damage they do may seem, intuitively, to be negligible.[12] But intuitions concerning complex phenomena of large and unfamiliar extent are often unreliable. The intuitions in question are, moreover, suspect in another way: the conviction that I am doing no harm may be comforting, even self-serving, hence prejudicial. Climate change is, in Stephen Gardiner's memorable phrase, a "perfect moral storm," rife with enticements to moral and intellectual corruption.[13] We should

[11] For more on why harm accelerates with increasing temperatures, see John Broome, *Climate Matters: Ethics is a Warming World*, (New York: W.W. Norton & Company, 2012), 33-6.

[12] For a defense of these intuitions, see Walter Sinnott-Armstrong, "It's Not *My* Fault: Global Warming and Individual Moral Obligations," in *Perspectives on Climate Change*: *Science, Economics, Politics and Ethics*, *Advances in the Economics of Environmental Resources*, vol. 4, Walter Sinnott-Armstrong and Richard B. Howarth, eds., (Amsterdam: Elsevier, 2005), 289.

[13] Stephen M. Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change* (Oxford: Oxford University Press, 2011).

not, therefore, take the harmlessness of individual emissions for granted.

In order to challenge the assumption that the harm of individual emissions is negligible, I have elsewhere attempted to calculate the human casualty rate per U.S. citizen for lifetime greenhouse gas emissions. It turns out that the average American's share of the total anthropogenic emissions from the beginning of the industrial revolution to 2040 is about one two-billionth. Given that over the coming centuries it seems likely that billions of people will suffer and/or die as a result of climate change, I infer that the average American's share of the responsibility, through his or her complicity in humanity's collective GHG emissions, amounts to the suffering and/or deaths of roughly one or two future people.[14] This estimate, of course, is quite crude. And we should keep in mind that emissions differ widely between high consumers and low consumers, between the rich and the poor. The number might be much higher for those who consume an extraordinary amount of fossil fuel by for example, having large homes or multiple homes, flying frequently, driving large, inefficient vehicles, etc. In any case, this estimate suggests that individual emissions can contribute significantly to the bodily harm of others.

Of course no particular harm is attributable to the emissions of any specific individual. The CO_2 for which one individual is responsible is mixed in the atmosphere with the CO_2 from all other sources, and the harm results from the aggregate. But the cumulative harm over centuries is so vast and so directly dependent on total CO_2 emissions that even small emissions contribute significantly to that aggregate. Therefore, although it makes no sense to attribute particular harms to a given individual, it does make sense to attribute to her some small fraction of the

[14] J. Nolt, "How Harmful," and J. Nolt, "Replies to Critics."

vast quantity of total bodily harms that our emissions will produce over the coming centuries.

Premise 2: Unnecessary Emissions

Of course even if an individual's emissions are contributing significantly to the bodily harm of others, it does not follow immediately that she ought to eliminate them. To do so could be too costly, especially if she is poor. But among the affluent there are many cases in which the perceived benefit of some use of fossil fuels is actually trivial, or perhaps, all things considered, not really a benefit at all. Residential leaf blowers, for example, which are common in some developed nations, are generally unnecessary and—given the noise, pollution, cost, loss of exercise, etc.—may do more harm than good. Indeed, many devices whose use commonly requires the emission of greenhouse gases are in most of their uses *un*necessary. Other examples include: jet skis, SUVs, clothes dryers[15], big screen TVs, hot tubs and decorative electric lighting.

For any such devices, no doubt, one can find or imagine necessary uses. But these are not typical. In characterizing these devices as "unnecessary," I am referring to their common uses, not to any extraordinary, necessary ones they may acquire. It may be that no device is always either necessary or unnecessary, but the sorts of devices mentioned here are generally not necessary.

[15] Clothes dryers are unnecessary in places wherever their primary function can be accomplished by drying on an outdoor line or indoor rack without violating overriding moral obligations. For a personal account of the *joys* of line drying, see John Nolt, *Down To Earth: Toward a Philosophy of Nonviolent Living* (Washburn, Tennessee: Earth Knows Publications, 1995), 46-8.

Premise 2 claims that many uses by individuals of greenhouse-gas-producing devices are unnecessary. The term "necessary" is intended here in a moral sense: the use of a greenhouse-gas-emitting device is *necessary* if its non-use would violate overriding moral obligations—that is, only if there are no morally acceptable alternatives. The tractors needed to cultivate and harvest crops, for example, or the trucks needed to transport them to population centers are necessary in this sense. No adequate carbon-neutral alternatives are widely available; hence, since food is a human need, continued use of petroleum-fueled trucks and tractors is for now justifiable.

Even where carbon neutral alternatives exist, some greenhouse-gas-emitting devices may still be necessary. Given their other morally salient obligations, not many people can afford to replace conventional home power and heating systems with photovoltaic and geothermal systems or other carbon-neutral alternatives. Hence, for now, for many people, even in developed nations, fossil-fuel powered heating and electrical systems are still necessary.

Moreover, not all unnecessary devices are *independently* unnecessary. I may not need either an SUV or a pickup truck or a mini-van, but my job might require that I own at least one of these vehicles. So, while each is unnecessary for me, the disjunction may be necessary. Still, most affluent people employ many independently unnecessary greenhouse-gas-emitting devices.

It is not possible to specify here exactly which uses of greenhouse gas-emitting devices are necessary and which are not. Since moral obligations vary depending on the individual's social responsibilities and commitments, so does necessity, which entails the non-existence of overriding moral obligations. Nor would it be to the point here to try to define exactly what counts

as an overriding moral obligation. The examples offered above are sufficient to show that on any reasonable construal of necessity in this moral sense, many current uses of greenhouse-gas-emitting devices, especially among the affluent, are unnecessary. That is obvious in any case, and is all that premise 2 claims.

Premise 3: The Unavailability of Carbon-Free Energy Sources

It might not make sense to go to the trouble of relinquishing use of unnecessary devices if we could be reasonably sure that we could soon power them in a carbon-neutral way. But most of the greenhouse-gas-emitting devices currently in use will in fact not be so-powered anytime soon. Despite decades of development of wind, photovoltaic, biomass, hydroelectric and geothermal energy sources, by 2020 these will, according to the U.S. Energy Information Administration, still supply less than 15 percent of the global total. Nuclear power will account for about 10 percent. The remaining energy, over 75 percent, will be still supplied by fossil fuels.[16] Thus the day when the energy used by most of the world's population comes from carbon-neutral sources is still probably decades away. Some affluent people can afford the investment now to generate their own power sustainably with photovoltaic panels, geothermal devices and the like. This is a benefical thing to do—though less so, perhaps, if the aim is to "guiltlessly" maintain high rates of consumption. But many of those who cannot afford such an investment can still reduce their

[16] U.S. Energy Information Administration, "World total energy consumption by region and fuel," accessed January 14 2013, http://www.eia.gov/oiaf/aeo/tablebrowser/#release=IEO2011&subject=0-IEO2011&table=2-IEO2011&region=0-0&cases=Reference-0504a_1630

carbon footprints by reducing or eliminating unnecessary use of devices powered by greenhouse-gas-emitting energy sources.

Premise 4: A Moral Principle

The argument's moral claim is premise 4: one may not contribute significantly and unnecessarily to the bodily harm of others. Necessity, once again, implies overriding moral reason. Premise 4 is supportable by most, if not all, widely recognized moral theories. This is certainly true for deontological theories, nearly all of which endorse fairly robust principles of non-harm. Consequentialist theories, by contrast, typically permit bodily harm for the sake of greater benefit. But for many uses of the greenhouse-gas-emitting technologies that we are considering, it would be very difficult to make the case that the benefit outweighs the harm. Those uses, then, reasonably count as unnecessary, even on consequentialist theories. Rule consequentialist theories in particular, recognizing human moral frailty, generally require adherence to such principles of non-harm as rule 4, allowing exceptions, if at all, only where due consideration shows very clearly that following the principle does not promote the good. Premise 4 is also quite plausible on virtue ethics.

My use of this premise has little claim to originality. Avram Hiller has employed a similar principle to argue for a somewhat similar conclusion. Hiller's principle is, "it is *prima facie* wrong to perform an act which has an expected amount of harm greater than another easily available alternative."[17] This, presumably, means that it *is* wrong unless there are overriding moral reasons

[17] Avram Hiller, "Climate Change and Individual Responsibility," *The Monist* 94, (2011), 352.

to do it—that is, to use my terminology, it is wrong if unnecessary. Hiller makes it clear that in many cases he considers refraining from using a greenhouse-gas-producing device to be an easily available alternative. To that extent, Hiller's moral assumption and his overall argument are similar to mine.

The most important difference, I think, is that Hiller regards the harm of individual emissions as intermittent or probabilistic (hence his use of the notion of *expected* harm), whereas I assert the continuous dependence of harm on cumulative emissions. In other words, I regard harm from individual emissions as, not merely probable, but practically certain.

According to Hiller, "climate change is a threshold phenomenon."[18] That is, increasing emissions may for some time produce no additional harm and then suddenly (by, for example, some feedback mechanism such as the release of methane from melting tundra) contribute to significant harm. The thought seems to be that emissions prior to the crossing of the threshold are harmless until the threshold is crossed, and that the crossing of it is not certain.

It is, of course, quite likely that there are cumulative emission thresholds beyond which harm suddenly accelerates. However, given that the harms of climate change are numerous and that many of them are matters of degree and continuously temperature-dependent, I can see no reason to believe that emissions that occur before such a threshold is crossed contribute to no harm at all.

But let's grant for the sake of argument that there are periods prior to threshold-crossings during which relatively small emissions do not contribute to harm. Suppose, for example, that my emissions from driving a car have no effect before some

[18] A. Hiller, "Individual Responsibility," 358.

threshold is crossed several decades from now. Still (as Hiller would agree) they are not harmless. Rather, they are part of the cumulative total that precipitates the crossing of that threshold. If many recklessly lade a camel with straw, the breaking of the camel's back is not the fault solely of the one who adds the last straw.

Now here is the crucial point: it is practically certain that not only that threshold but many others like it to which my emissions also contribute *will* be crossed. The harm to which a given emission contributes is not a one-time affair; for, as we have noted, CO_2 is long-lived in the atmosphere. Its continuing effects, enhanced by various feedback mechanisms, are longer-lived still. In their survey of climate models Archer, *et. al.*, conclude:

> Nowhere in these model results or in the published literature is there any reason to conclude that the effects of CO_2 release will be substantially confined to just a few centuries. In contrast, generally accepted modern understanding of the global carbon cycle indicates that climate effects of CO_2 releases to the atmosphere will persist for tens, if not hundreds, of thousands of years into the future.[19]

The harms of an individual's emissions do not, therefore, cease with the crossing of one threshold. To suppose, then, that current emissions might not be harmful because they do not suffice to cross some particular threshold is to misconceive the nature of the harms of greenhouse gas emissions. It is practically certain that my emissions will contribute to the crossing of many thresholds and the causation of many harms.

We have derived this conclusion under the assumption (which I attributed to Hiller) that there are periods prior to threshold-crossings during which relatively small emissions have no harmful effects. I, however, reject this assumption; for, as I have argued

[19] D. Archer *et. al.*, "Atmospheric Lifetime," 131.

above, cumulative harm increases more or less continuously with cumulative total emissions. The harms to which individual emissions contribute are therefore practically certain, not merely probable. Hence we need not appeal to the probabilistic notion of *expected* harm in premise 4.

I conclude categorically that individuals are morally obligated not to use greenhouse-gas-producing devices unnecessarily.

III

Objections and Replies

Premise 1 may give rise to various objections. In this part, I attempt to answer some of these, and also to consider some objections that might be raised against other aspects of the argument.

Geoengineering

It might be argued against premise 1 that the harms of climate change will be considerably less enduring and severe than I have suggested, because once they get bad enough humanity will reverse climate change by geoengineering. But apart from biologically-based schemes, such as the planting of trees, all geoengineering techniques are untested at large scales, dubious in efficacy, potentially dangerous, ethically questionable,[20] and unlikely to be deployed in the near future.

Even tree-planting is effective only with perpetual management or artificial sequestration of the carbon captured by

[20] S. Gardiner, *A Perfect Moral Storm*, ch. 10.

the trees. If we plant trees enough to offset a certain quantity of carbon emissions today and later these trees are cut and used in a way that releases their carbon content, then the sequestered carbon will be returned to the atmosphere, and in the long run it will be as if we had not planted the trees at all. For such reasons many extant carbon offset schemes are of dubious long-term value.

Geoengineering will certainly not prevent harms that are occurring now or that will occur in the coming decades, since it would take decades to put planet-wide geoengineering schemes into action. Moreover the costs of geoengineering schemes, assuming they are implemented, are themselves harms, to be borne by future people. Also, no effective geoengineering scheme is likely to be totally benign. Each itself causes some harms directly. Some may also cause indirect harms, such as the international conflict that could result should any nation or group of nations try to implement them. For such reasons, it is not at all certain than any effective geoengineering technique will ever be deployed—or that, if it were, the benefits would be worth the costs. Whatever hope lies in geoengineering therefore seems insufficient to negate our obligation to relinquish unnecessary uses of greenhouse-gas-producing devices now.

Discounting

Advocates of the use of cost-benefit analysis in long-range decision-making are likely to object to premise 1 that since many of the harms caused by current emissions occur far in the future, they should be discounted to such an extent that they are negligible now. Discounting is the practice of valuing future outcomes, regardless of whether they are gains or losses, less than

present ones. The more distant they are in the future, that is, the more closely their value approaches zero.

Discounting is often well justified in short-term economic and policy decisions. But, even assuming a consequentialist ethic, discounting has no valid justification for moral decisions involving bodily harm and loss of life to future people. To show this, however, requires a careful survey and critique of discounting's various, often conflicting, justifications—something well beyond the scope of this paper. Fortunately, such critiques already exist. One of the best is still Derek Parfit's.[21]

Non-Identity Objection

There is another very different sort of objection that is often discussed in the philosophical literature—an objection based on the widely debated non-identity problem. Since I have dealt with this objection elsewhere,[22] my discussion of it here will be brief. In the present context, it amounts to the claim that premise 1 is false, because climate change will not harm people in the distant future.

This objection is best understood from the point of view of those people living centuries hence whom I claim will be harmed by our emissions. The problem is that they will owe their existence to these very same emissions. For had we and our contemporaries (contrary to fact) quickly and deeply reduced greenhouse gas emissions so as to save them from harm, then they would never have been born. This is because such an achievement would have required great social and economic

[21] Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, 1984), Appendix F.
[22] J. Nolt, "Replies to Critics," 114-16.

reorganization. Many people would have had different careers or lived in different cities, and their children would have had children with different mates. Over generations, the creation of people different from those who would have existed without the policy change would ramify through the global population. Therefore those people in the far future whom we sought to protect from climate change would never have been born, and another population entirely would exist in their place.

But, claims the objection, people are harmed by an action only if it makes them worse off than they would otherwise have been. Since the very existence of the distant future people whom I claim we are harming depends on our continuing emissions, they are not made worse off by our actions than they otherwise would have been; for it is not worse to live and suffer harm from climate change than never to live at all. Hence our emissions do not harm them—so the objection contends.

The main problem with this objection lies in the criterion of harm that it employs. It is simply false that people are harmed by an action only if it makes them worse off than they would otherwise have been. To see why, suppose that humanity does not substantially reduce emissions and severe climate change results and imagine a person living, say, a couple of centuries hence. Her life, we may suppose, is hard because of the degraded climate in which she lives. She is, however, generally healthy. But suddenly she is killed by a hurricane that was made lethally powerful by our emissions. Our actions result both in her existence and, after she comes into existence, her death. In killing her, in an obvious and morally relevant sense they harm her. Advocates of the objection, however, deny that she is harmed. They think we should lump both results of our emissions together and use the ensemble to determine whether those emissions cause harm. But why? The two consequences are

separable. Our actions first contributed to her existence. When her life began, she became susceptible to harm. Later, our actions harmed her. We may grant that, on the whole, the life she had was best for her, perhaps even the only life she could have lived. Still, living the best life one could have lived, or even the only life one could have lived, does not preclude being harmed in a morally relevant sense. Proponents of the non-identity objection are mistakenly committed to the belief that it does.

Hale's Objection

Another sort of objection takes aim at my moral premise, premise 4: one may not contribute significantly and unnecessarily to the bodily harm of others. Act consequentialists, in particular, may deny this premise, on the ground that if the harm is inevitable, then whether we contribute to it or not makes no difference to the permissibility of our actions. Benjamin Hale argues that massive climate change *is* inevitable because, for psychological and economic reasons, market incentives will, absent certain unlikely conditions, cause all the earth's fossil fuels to be consumed.[23] This prediction is, of course, uncertain. But suppose it is true. Then, given that the harm of climate change is dependent largely on cumulative total emissions, an individual's emissions do indeed make little difference to the cumulative harm that eventually results, for others will burn whatever fuel she saves. At best, an individual might, by refraining from emissions, delay some harms slightly. But comparable harms will nevertheless eventually occur. There seems, therefore, to be no act consequentialist reason for individuals to limit their emissions.

[23] Benjamin Hale, "Nonrenewable Resources and the Inevitability of Outcomes," *The Monist* 94 (2011), 369-390.

This depends, however, on the uncertain assumption that all fossil fuels will eventually be burned. Given that there is a chance that humanity will switch to sustainable energy sources before this comes to pass, by limiting our emissions we increase at least the probability of a better outcome. Thus we still have an act consequentialist justification for eliminating unnecessary emissions.

Even if, however, the consumption of all the fossil fuels on earth were known to be inevitable, there would still be an act consequentialist reason to conserve now. For, in that case, people living near the end of the fossil fuel era would likely be in dire straits. Some of them might need fossil fuels just to survive. Act consequentialism would advise us, then, to eliminate our unnecessary emissions in order to save some fuel for them.

Finally, suppose that the burning of all fossil fuels were certain, and that it was also certain that no one would need them after they were used up. In that case, of course, we genuinely could not affect the overall outcome. But still we would still have *non-consequentialist* reasons for conserving now. (This, precisely, is Hale's point.) Non-consequentialists can argue that we ought to avoid contributing to unnecessary bodily harm, whether or not others are doing so, and whether or not our doing so affects the outcome. Hence, they can readily conclude, we still ought to eliminate our harmful and unnecessary emissions. Non-consequentialist justifications for premise 4 are therefore unaffected by the objection.

Compensatory Benefits

We benefit future people through our development of science, technology, medicine and the arts. Another objection asks: why

don't these benefits compensate for and hence justify the harms of our emissions?

Some emissions may well be justifiable in this way. But the specific emissions at issue here—those that are unnecessary—are not justified by overriding moral reasons (including compensatory benefits to future people). Compensatory benefits claims are thus irrelevant to my argument.

The Demandingness Objection

Still, my conclusion may seem excessively demanding to many. In response to such demanding imperatives, some authors have sought to limit individual responsibilities by adopting a principle, known as an "agent-centered prerogative," according which each person may give greater weight to her own interests than to the interests of any other person.[24] According to this principle, we may appropriate to ourselves the wherewithal for a fulfilling life before worrying about spatially or temporally distant others.

Superficially, agent-centered prerogatives seem fair because they are granted to all agents equally. But there is real danger of injustice in their application. As an affluent American, I may use my agent-centered prerogative to consume unnecessarily at the expense of the poor and destitute, both now and in the future, who bear the brunt of the harms of climate change. Of course, they too have their agent-centered prerogatives. But, being reduced to destitution, they have little or no opportunity to take advantage of them. Allowing them greater moral license to attend to their interests does them little or no good. Thus an agent-centered prerogative may inequitably benefit the affluent. If,

[24] See Tim Mulgan, *Future People: A Moderate Consequentialist Account of Our Obligations to Future Generations* (Oxford: Oxford University Press 2008), § 4.1.

moreover, it permits me to continue my unnecessary emissions, which are harmful to others, I cannot see that it is morally defensible.

Wrong-Strategy Objection

Various authors (most notably Walter Sinnott-Armstrong)[25] have argued that the individuals' chief concern regarding climate change ought not to be with reducing their emissions, but rather with working politically to transform the fossil-fuel-powered economy in which we are all compelled to participate. I see no reason why we should not do both.

IV

Strategies for Relinquishment

Given that we ought to eliminate unnecessary uses of greenhouse gas producing devices, what is the best way to do so? Individuals lack the ability to render their emissions harmless by, say, ensuring their sequestration. Most also lack the ability to power their greenhouse-gas-producing devices by sustainable energy sources. In general, then, the quickest, cheapest and most practical way to eliminate unnecessary emissions is simply to stop using the devices that produce them.

Nonuse can be achieved in either of two ways. One is to retain the devices but refrain from using them unnecessarily. The efficacy of this strategy depends on the agent's resolve. Because the devices remain available, the temptation to use them may be

[25] W. Sinnott-Armstrong, "It's Not *My* Fault."

difficult to resist. Their non-use is apt to seem impertinent and absurd—especially since much of the harm of climate change is spatially and temporally distant.[26]

The second option is to make the devices unavailable to ourselves—to get rid of them. To get rid of is *not* to sell or give away. That would not solve the problem. An SUV, a jet ski, or a hot tub, for example, would not lose its carbon footprint if acquired and used by someone else. The harm would continue. To get rid of them we must render them permanently inoperable—that is, destroy them. That, however, may not be psychologically easy. Hence this strategy may require even more resolve than nonuse, though over a shorter period of time. (If I could once muster the gumption to dismantle my hot tub, for example, it would take considerable effort and money to acquire a new one, which would likely be less tempting than using it while it remains operable on my back porch.)

Thus with both nonuse and destruction there are motivational difficulties. These vary, however, from person to person and from device to device. Those who can pursue one or the other of these strategies should do so. But, of course, not all will. The question then becomes: what practical ways are there to overcome the remaining motivational difficulties so as to enable the others more nearly to meet their obligations?

Fortunately, though somewhat ironically, there are slower, more passive, and hence psychologically easier means of

[26] This strategy has the additional, though perhaps minor, drawback that some devices have a carbon footprint even when not in use. Many electrical devices, for example, produce "ghost loads," so long as they are plugged in to a live outlet. Thus even refraining from using such a device may not eliminate its carbon footprint. There is an easy remedy: unplug the device or switch off its power at a power strip when it is not in use. But even those who intend always to do so sometimes forget.

destruction. Contemporary manufacturing techniques insure that most devices self-destruct rather quickly; they wear out, break, or become obsolete. Thus instead of immediately destroying the device oneself, one might overcome the motivational difficulties by waiting until it self-destructs or becomes obsolete, and simply refraining from buying a new one. While slower than immediate destruction, this would in many cases produce emissions reductions much sooner and more certainly than waiting for the energy infrastructure to change.

There are other means of overcoming the motivational problems as well. Sometimes getting rid of a greenhouse-gas-emitting device (and perhaps fulfilling its function with a carbon-neutral technology) produces monetary savings. Replacing a car (perhaps a second car) with a bicycle, or a clothes dryer with a clothes line or rack, are good examples. For those with sufficient strength, using muscle power (as, for example, by biking rather than driving, or mowing with a push mower or scythe rather than a fossil-fuel-powered lawn mower)[27] may provide healthful exercise, without noise or air pollution. None of these ideas can work for everyone, of course, but it should be clear from these examples that the motivational problems are not in all cases fundamentally insuperable.

To summarize, individuals are morally obligated eliminate their unnecessary uses of greenhouse-gas-producing devices. There are main two ways to do this: to retain these devices but stop using them unnecessarily, or to get rid of them. Both present motivational difficulties, but these are not wholly insurmountable, and partial compliance is possible even for those who fail to meet their full obligations. Which of these two strategies is most

[27] In my experience (I have mowed exclusively by muscle-power for over twenty years), a good grass scythe is considerably more efficient than a push mower. See J. *Nolt, Down to Earth*, 43-6.

feasible for a given person and device will vary, but each can reduce our personal emissions more quickly and cheaply than just about anything else we could do.[28]

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[28] Earlier versions of this paper were presented to the *Ethics, Energy and the Future* conference at Delft University of Technology, June 24-26, 2010, and to the *Appalachian Public Interest Environmental Law Conference*, University of Tennessee School of Law, November 19-21, 2010. I am grateful to Matt Deaton, Joel MacClellan, Annette Mendola, David Reidy, Clerk Shaw and the late Lee Shepski for helpful suggestions on early drafts. Two anonymous reviewers for this journal also contributed many useful comments.

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