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Changing images of climate change: human rights and future generations

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Whilst the climate itself has been changing over recent decades, our understanding has also been evolving. This article highlights four images of the normative significance of climate change. The earliest two, making room and avoiding encroachment, assume that the primary normative issue was how to distribute permissions to emit the carbon dioxide from fossil fuels, which is the chief force undermining the climate. But the evolving science established that the remaining cumulative carbon budget compatible with tolerable degrees of climate change is too small, however it is distributed. The most urgent imperative is to exit the fossil fuel regime and construct an alternative energy regime. The third image pictures this transition as an invaluable opportunity for institutional innovations protecting rights understood to include at least the subsistence need for essential energy. The fourth image, avoiding forced choice, underlines the responsibility of the current generations not to leave future ones with nothing but alternatives that undermine rights.

Keywords: *climate change, human rights, future generations, cumulative carbon budget, justice*

> I have tried to remain alert to the fact that the people, events, and forces described … carried in them the seeds of other, perhaps less terrible, futures.[1]
>
> There is a tendency in our planning to confuse the unfamiliar with the improbable.[2]

1 EARLY IMAGES OF CLIMATE CHANGE

Many of the most important and difficult questions that arise about human rights concern the conceptualization and allocation of the attendant responsibilities (or 'correlative duties'), especially where the responsibilities concern people who will live in the future.

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1. C Clark, *The Sleepwalkers: How Europe Went to War in 1914* (Penguin Books, London 2013), at xxix.
2. T Schelling, 'Foreward', in R Wohlstetter, *Pearl Harbor: Warning and Decision* (Stanford University Press, Stanford 1962), at vii.

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This article engages in a kind of conceptual mapping because in the critical case of the rights and responsibilities affected by climate change, my own understanding – and, I believe, the general understanding of those concerned about our duties – has changed significantly across recent decades, partly in response to the impressive scientific progress in understanding climate change over the last quarter of a century and partly in response to the shameful lack of governmental progress in confronting this emerging reality, which has allowed climate change to worsen severely over these years. Thought has focused at various points around at least four different images, the last two of which are far more adequate than the first two, specifically in revealing the respects in which the human rights of future generations are at stake, as humans respond, or fail to respond, to the changing climate that human emissions are causing.

The first image, in a reflection about responsibility regarding climate change, can roughly be characterized as the image of *making room*. Once scientists realized that anthropogenic emissions were undermining the stability of the planet's climate, it was obvious that some limit would have to be imposed on total human emissions. And, if there was a limit, then there was a problem of distributive justice: shares of the limited total of 'safe' emissions were 'zero-sum', and shares of the total allowable emissions ought to be distributed equitably. The question of the equitable sharing of emissions became the central issue in the international negotiations about how to deal with climate change from the beginning, thanks in large part to an influential critique of a World Resources Institute study by two Indian scholars at the Centre for Science and Environment in New Delhi, Anil Agarwal and Sunita Narain.[3] Agarwal and Narain made a number of important contributions, including: (a) a distinction between 'survival emissions' and 'luxury emissions',[4] which I have promoted as 'subsistence emissions' and 'luxury emissions',[5] but at least as importantly, (b) the significance of cumulative emissions and what they called '*historical inequity*',[6] which was taken up in a big way by the Brazilian government, who offered quantifications of what came to be called 'historical responsibility' based on total cumulative emissions, but which was subsequently brusquely dismissed by the US government.

Since less developed countries could not develop without increasing emissions, it followed that if the global total flow could not expand, some countries – and it seemed reasonable that they should be the ones who had already developed – should emit less in order to 'make space' for increases by developing countries. This is the image of *making room*: total global emission flows cannot rise but emissions by poorer countries must rise if they are to develop, so the demand of justice is that wealthy countries reduce their emission flows enough to make space within the limit for the increasing emissions of the poorer countries. One could construe this, as I did, following Agarwal and Narain, as eliminating luxury emissions to make space for subsistence emissions.

The second image invoked, following after *making room*, was what could be called *encroachment*. If a resource was abundant, one could take more than one's fair share of it – let's not worry about how the shares are determined or why there are shares, in this

3. A Agarwal and S Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* (Centre for Science and Environment, New Delhi, 1991).
4. Ibid., at 5.
5. H Shue, 'Subsistence Emissions and Luxury Emissions' (1993) 15(1) Law and Policy 39–59, reprinted in S Gardiner, S Caney, D Jamieson and H Shue (eds), *Climate Ethics: Essential Readings* (Oxford University Press, New York 2010), 200–1, and in H Shue, *Climate Justice: Vulnerability and Protection* (Oxford University Press, Oxford 2014, 47–67.
6. Agarwal and Narain (n 3) at 22.

case – without actually harming anyone. One might call this 'harmless unfairness', although of course others might still criticize on the grounds of excess even though none of them – nor anyone else – was any worse off because of the unfairness. Greediness amidst abundance can be a clear case of excess without damage – one takes too much, even though one may not actually be taking the excessive portion away from anyone else if there is more than enough to go around. But if total emission flows are limited – 'zero-sum' – and that is the reason why each must be assigned a share of the emission flow, then if one exceeds her share, she encroaches on the share of someone else: 'excess encroaches'.[7]

Consequently, there are two separate grounds on which one's conduct can be criticized when a resource is limited. It may be *unfair* simply in that one has taken more than one's share, but it may also be *damaging* because one has encroached on someone else's share, depriving him of his full share.[8] One is then not simply failing to make room by reducing one's own share, but one is taking room away from someone else to whom it rightly belongs by exceeding one's share. Thus, the latter seems to be not simply unfair but also to be the violation of a negative duty, a duty not to deprive others of their due. Normally, depriving others leaves them worse off. Suppose there would have been enough for everyone if each had stuck to her own share; but I took more than my share, so now someone will have less than her share because of me. For example, there is room under the emissions ceiling for India to develop, but the EU, say, use part of India's share of emissions so now there are not enough emissions left under the ceiling for the Indians. So those with the highest emissions have the positive responsibility to make room and the negative responsibility not to encroach. Both obviously rest on the shares being zero-sum. But one should also notice that in this picture, whilst the shares are zero-sum, the total is implicitly taken to be adequate: if each sticks to his own share, everyone can somehow have enough.

However, in the 1990s our collective grip on the importance of cumulative emissions was still rather fuzzy because we lacked vital pieces of information. Indeed, climate change is a striking illustration of how deepening empirical understanding as well as sharpening conceptual understanding can transform how a moral problem has to be conceived. It was perfectly clear that, as Agarwal and Narain had emphasized, the total emissions so far by the countries who had industrialized, who were most, but not all, of the richest countries, vastly exceeded the emissions by the countries like India, the vast majority of Africa and, at that point, China, who had not industrialized. This seemed intuitively unfair unless one belongs to the school of thought that believes that things simply belong to whoever appropriates them first. But if these earlier emissions were somehow to a considerable degree being dissipated or were decomposing into their constituent elements, then it also seemed retributive or punitive to focus so much on the past. In so far as the past emissions were spilt milk, or water under the bridge, it seemed wiser – and certainly more pragmatic – to be more forward looking. In particular, it was widely accepted among scientists at the time that the atmospheric lifetime of the carbon dioxide emitted was around a hundred years, so although this gas persisted much longer than, say, methane, it too would pass away. Or so many thought twenty years ago.

7. H Shue, 'After You: May Action by the Rich Be Contingent Upon Action by the Poor?' (1994) 1(2) Indiana Journal of Global Legal Studies 343–66, reprinted in Shue, *Climate Justice* (n 5), 68–88.
8. Simon Caney has an important analysis of this distinction in S Caney, 'Two Kinds of Climate Justice: Avoiding Harm and Sharing Burdens' (2014) 22(3) Journal of Political Philosophy doi:10.1111/jopp.12030.

Accordingly, the crucial issue about distributive justice appeared to be how to allocate shares of total global *annual* emissions – the focus was on annual flows. The argument was over the extent to which current shares of annual emissions should be reduced in light of historical emissions: should the US and the EU be assigned lower shares now because they had already emitted so much in the past, or should so-called historical responsibility be ignored in making the current allocation? Cumulative emissions were entering the debate, but – and this is the main point here – cumulative emissions were coming in as one possible consideration in the allocation of current and future shares of annual flows. The fundamental question was taken to be: how should current and future shares of annual emission flows be allocated? Obviously the answer would be affected by the total amount that could still be emitted without causing dangerous climate change, but no one knew what that amount was – we knew only that we could not keep increasing, or even maintaining, current total global emission flows because those emissions were undermining climate stability.

Both images assume that the annual flow of emissions is limited and therefore needs to be fairly shared. Importantly, however, the first image, in particular, implicitly assumes as well that there is a total annual flow such that the annual total is capable of being shared both fairly and safely, where 'fairly' means specifically that each nation can be assigned all the emissions it needs for its economic activity and 'safely' means specifically that climate stability can be established at some reasonable level – say, for simplicity, after a temperature rise of no more than 2°C above pre-Industrial temperature – within this annual total of emissions.[9] In brief, if we share annual emissions fairly, we can stabilize the climate and protect (most) human welfare. Unfortunately, we have learned that this assumption is now empirically false.[10] There is no amount of emissions additional to those already released by 2014 that would provide the energy required for the economic activity needed by all nations that is also compatible with a temperature rise of no more than 2°C.[11]

2 THE CUMULATIVE CARBON BUDGET

The reason why the empirical assumption that fairness and safety are compatible is mistaken mainly turns on the atmospheric lifetime of carbon and the consequent very special role of carbon and accumulating carbon dioxide. Atmospheric scientists had long acknowledged that they did not fully understand the behaviour of carbon dioxide in the atmosphere.[12] By the Fourth IPCC Report in 2007 the scientists were saying that an atmospheric lifetime for carbon dioxide was not one hundred years, as the earlier consensus had had it, but was 'incalculable', although it was certainly considerably

9. 'Safely' is a highly relative term: many species have already been driven to extinction, and a number of low-lying islands that are people's homes are being submerged.
10. If governments had taken vigorous action promptly after officially acknowledging the problem in 1992, it might have turned out to be true then. Two decades of denial of the problem have caused adequate solutions to become far more demanding.
11. Evidence is cited in the following section. I speculated that this might soon be the case in H Shue, 'Climate' in D Jamieson (ed.), *A Companion to Environmental Philosophy* (Blackwell, Malden, MA 2001), 449–59; reprinted in Shue, *Climate Justice* (n 5), 195–207.
12. J Houghton, *Global Warming: The Complete Briefing* (Cambridge University Press, Cambridge 1997, 2nd edn), 24.

longer than one century and clearly involved multiple centuries or even millennia.[13] In the IPCC's Fifth Assessment Report it becomes clear that 'an' atmospheric lifetime for carbon dioxide is incalculable because different molecules of carbon dioxide have very different life histories. Various molecules of CO_2 become involved in different chemical reactions in the atmosphere: 'the times of atmospheric CO_2 adjustment to anthropogenic carbon emissions can be divided into three phases associated with increasingly longer time scales'.[14] Phase 1 is the first one thousand years, phase 2 is the next 'few thousands of years' up to around 10,000 years, and phase 3 is the next several hundred thousand years.[15] So, in phase 1 'within a thousand years, the remaining atmospheric fraction of the CO_2 emissions is expected to be between 15 and 40%, depending on the amount of carbon released. The carbonate buffer capacity of the ocean decreases with higher CO_2, so the larger the cumulative emissions, the higher the remaining atmospheric fraction'.[16] Some important studies use 25 per cent as an approximation of the amount of CO_2 that will remain in the atmosphere after a millennium, but the worst news is that as the amount humans emit increases, the percentage that will remain beyond a millennium also rises because the ocean becomes more nearly saturated.[17] With regard to phase 2: 'this second phase will pull the remaining atmospheric CO_2 fraction down to 10–25% of the original CO_2 pulse after about 10 thousand years'.[18] And in terms of phase 3: 'within several hundred thousand years, the rest of the CO_2 emitted during the initial pulse will be removed from the atmosphere …'.[19]

The first implication is: no one can plausibly claim that human emissions will not affect very distant future generations – forget great grandchildren, we are talking hundreds of thousands of years – because significant percentages of our 2014 carbon emissions will still be in the atmosphere after that period, still holding in heat, and the higher our emissions are absolutely, the higher the percentage of them that will remain after tens and hundreds of thousands of years. One can argue about how to define 'irreversible', but these are, from the perspective of humanity, irreversible changes.

A second implication is that the mind-bogglingly long atmospheric lifetime of CO_2 means that among all the various kinds of greenhouse gas emissions, carbon emissions reign as supremely dangerous, making fossil fuels the threat that must be tackled hardest and most decisively. In order to see more fully why, one needs one more step in the empirical analysis before one can return to thinking about our responsibility towards future generations. For a number of reasons, but centrally because of the extraordinary persistence of CO_2 once it is injected into the atmosphere, the physicists have calculated that the single most important consideration for climate change is what

13. See GA Meehl, TF Stocker, WD Collins, et al., 'Global Climate Projections', in S Solomon, D Qin, M Manning, et al. (eds), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge 2007), 824.
14. P Ciais, C Sabine, G Bala, et al., 'Carbon and Other Biogeochemical Cycles', in T Stocker, D Qin, G-K Plattner, et al., *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, Cambridge University Press 2013), 472.
15. Ibid., 472–3.
16. Ibid., 472.
17. This will of course produce disastrous acidification of the oceans.
18. Ibid., 473.
19. Ibid.

they have called the *cumulative carbon budget.*[20] It turns out that there is a linear relation between rise in average global temperature and the total amount of carbon emitted since the burning of coal in the Industrial Revolution began to take carbon out of sequestration under the earth and to add so much active CO_2 to the climate system that the amount of CO_2 that migrated into the atmosphere began to rise. Nothing correlates more straightforwardly with the rise in global temperature (and all the associated manifestations of climate change) than the total amount of carbon dioxide added to the active climate system since around 1750. The amount added to the system has a linear relation with the amount that moves into the atmosphere, and the amount that moves into the atmosphere has a linear relation with the rise in average global temperature.[21]

So, name an amount of rise in average global temperature one is willing to tolerate – say, 2°C – and the probability of only that much of a rise occurring – say, better than 50/50 – and the atmospheric physicists can specify what they believe is the size of the cumulative carbon budget compatible with that probability of that temperature. The numbers have become more precise in the Fifth Assessment Report, but an accessible approximation is on a website maintained by the Department of Physics of the University of Oxford (http://trillionthtonne.org/), which shows that on current trends of increase in the rates of emissions – that is, if people do no more about climate change than we are doing now – humans will emit the last carbon dioxide compatible with a better than even chance of the temperature not rising more than 2°C in December 2040 – only 26 years from now. So, generally, obviously we need to do a lot and do it fast if we do not want to leave many future generations in a desperate situation.[22] More specifically, annual flows of carbon emissions continue to matter, but the respect in which they matter is how soon they are driving the total cumulative amount of carbon beyond the budget for a reasonable probability of a reasonable temperature.[23] Cumulative emissions are not a background factor possibly to be considered in arriving at a sustainable level of annual emissions. Declining transitional levels of annual emissions must be set so that an excessive cumulative total of emissions is never released. There is no sustainable level of annual emissions for more than a very few years from now.

20. The original suggestion is in M Allen, D Frame, K Frieler, et al., 'The Exit Strategy' (2009) 3 Nature Reports: Climate Change, 56–8, at 57. Other reflections on its significance are: NHA Bowerman, DJ Frame, C Huntingford, et al., 'Cumulative Carbon Emissions, Emissions Floors and Short-term Rates of Warming: Implications for Policy' (2011) 369 Philosophical Transactions of the Royal Society A, 45–66; RT Pierrehumbert, 'Cumulative Carbon and Just Allocation of the Global Carbon Commons' (2013) 13 Chicago Journal of International Law 527–48; and M Collins, R Knutti, J Arblaster, et al., 'Long-term Climate Change: Projections, Commitments and Irreversibility' in Stocker, Qin, Plattner, et al. (n 14).

21. Collins, Knutti, Arblaster, et al. (n 20), 1108–9.

22. The fourth image below partly characterizes the general nature of the situation threatened. More specifics can be found in: World Bank, *Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience* (Washington, World Bank 2013), and will appear in *Climate Change 2013: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge University Press, Cambridge forthcoming).

23. A recent analysis primarily based, not on climate models, but on paleoclimate data from the evidently most nearly comparable interglacial period, offers powerful and disturbing reasons to believe that aiming for a 2°C rise in temperature on the scientific assumptions made by the IPCC is much too unambitious and that movement away from the fossil fuel regime must be much more rapid – see J Hansen, P Kharecha, M Sato, et al., 'Assessing "Dangerous Climate Change": Required Reduction of Carbon Emissions to Protect Young People, Future Generations and Nature' (December 2013) 8(12) PLoS ONE e81648, doi:10.1371/journal.pone.0081648 (online open access).

Our fundamental question becomes: how should one conceive of the responsibility to take the actions necessary to avoid exceeding a tolerable global total of cumulative carbon emissions (and then what, if anything, does this have to do with human rights)? The empirical reality that one needs to face is: there are not enough carbon dioxide emissions left in the cumulative carbon budget for very much economic activity. To fight mostly over how to divide up those emissions is largely to miss the point. The goal is not to get a larger slice of the pie of carbon emissions; it is to create a non-carbon-based pie. That is, the primary question is not: who gets to burn the coal, oil and gas? The main question is: how fast can humanity exit the carbon regime entirely and get our energy from other, non-carbon sources?[24]

Nicholas Lord Stern makes the same point:[25]

> It is surely clear that (i) there is a great risk that the possibility of giving the world a 50–50 chance of 2°C will be lost[,] (ii) all must be involved in strong reductions of emissions if we are to have any chance of achieving that target, (iii) even if rich country emissions were zero in both 2030 and 2050, the per capita emissions of developing countries would have to be around 4–5 tonnes by 2030 and 2.5 tonnes by 2050; and recall that China is currently heading for 10–11 tonnes per capita in 2030.[26]

To put this in perspective, not only is China heading for 10–11 tons per capita, but Australia, Canada and the United States, who have the highest per capita emissions of all major countries, were already in 2005, emitting respectively, 27.3, 24.9 and 23.0 tons per capita (because they burn such extravagant amounts of fossil fuel)! For the per capita emissions of developing countries to be 4–5 tons in 2030 and then drop to 2.5 tons in 2050, they would either have to abandon development entirely or need largely to escape from fossil fuels, which are currently the only energy they can afford. Similarly, if the rich countries are to have zero emissions of greenhouse gases, either their economies must collapse entirely or they must fully escape fossil fuels. Both rich and poor countries must have very-low-carbon economies, and no country can come close to abandoning fossil fuels without having alternative sources of energy. So the operative question has become: how shall we share the responsibility for bringing about the transition from the carbon energy regime to a very-low-carbon regime?

Stern claims that equity, understood alongside what I am calling the two early images regarding emissions rights, 'is on a collision course with practical politics'[27] and later comments: 'There is little point in "equitable access to a train wreck"'.[28] Along with observing that 'ethics matters',[29] Stern positively suggests:

> There is a way forward. It is not to drop the equity criteria but to embed them in the twin ideas of rich countries embarking on a dynamic and attractive transition to the low-carbon

24. Both questions still matter – see Caney (n 8).
25. A slight complication is that the 'tons' that he is talking about are tons of CO_2e rather than simply tons of CO_2. A ton of CO_2e is a unit of all major greenhouse gases taken together that has approximately the same forcing effect on climate as a ton of CO_2. The CO_2 remains the dominant factor, and for our purposes we need not worry about the differences between the two measures.
26. N Stern, 'Ethics, Equity and the Economics of Climate Change, Paper 2: Economics and Politics' (forthcoming) Economics and Philosophy, [MS 40].
27. Ibid., [MS 46].
28. Ibid., [MS 47].
29. Ibid., [MS 54].

> economy in their own economies and supporting that transition in the developing world as a policy chosen by those countries themselves as a driver of growth and poverty reduction that is capable of becoming sustained.[30]

What could it mean to embed the equity criteria in the twin ideas of rich countries making their own transition to a low-carbon economy and supporting the same transition in the developing world?

Let's take one last look at the first two images of responsibility that have lain behind much of the literature on moral issues about climate change. We have noted two of their assumptions. First, they implicitly assume that there is a total annual flow of carbon emissions such that the annual total of emissions is capable of being shared both fairly and safely. This is an empirical assumption, and it is false – we cannot remain within the total cumulative carbon budget for a reasonable probability of any tolerable temperature rise while producing anywhere near the carbon emissions that would be necessary to sustain rich and poor economies on fossil fuel for more than a few more years from now.

The other assumption was that the annual flow of emissions is limited and therefore needs to be fairly shared. The first half of this assumption is oh-too-true: the annual flow of emissions is severely limited by the need to stay within a reasonable cumulative carbon budget. It is so very limited, however, that fairly sharing the remaining emissions that it is safe to release sinks into secondary significance. The carbon-emissions pie is becoming so small that getting a large piece of it is hardly worth the trouble, and expanding this pie would, of course, be dangerous. We still should share the carbon emissions that remain inside the cumulative carbon budget as fairly as we can, but there are not nearly enough to go around beyond the very short term. Carbon emissions safe for the climate are absolutely scarce. What is urgently needed is a rapid escape from the dominant fossil fuel energy regime that is the source of our problems and is, along with nuclear weapons, the most serious threat to future generations. What must be considered is responsibility across time.

Stern's constructive point is that in the circumstances everyone now faces, energy is at one level not zero-sum but positive-sum. Everyone needs a non-carbon energy regime.[31] Developing countries need it, or they will be locked into the obsolete hand-me-down infrastructure of a carbon energy regime that is not remotely sustainable and must be left behind as soon as possible. Rich countries too need the non-carbon energy regime, or they will cut their own throats, along with everyone else's, by blowing a huge hole in the carbon budget with their energy demands. We all need the non-carbon energy regime, and we all need it soon. On this our interests do not diverge – they coincide. The EU can do what is best for its grandchildren while doing what is best for India's grandchildren: find substitutes for fossil fuels.

30. Ibid., [MS 46–7].

31. Except those who leave their wealth tied up in reserves of coal, oil and gas that we dare not burn because of the disastrous quantities of carbon emissions that would result with any available technology – see *Unburnable Carbon 2013: Wasted Capital and Stranded Assets* (Carbon Tracker Initiative and Grantham Research Institute on Climate Change and the Environment, London 2013). Some firms are clearly gambling that these assets will not be stranded because governments will never take effective action on climate change by limiting carbon emissions.

3 ENERGY POLICY AS HUMAN RIGHTS FULFILMENT

Perhaps this means, then, that human rights do not have much to do with responsibilities towards future generations – this is really all about energy policy and who pays for it. What Stern does not emphasize, however, is that distributive questions do not go away simply because all nations and all generations need non-carbon energy. One still must choose who bears the burdens inherent in making the energy transition: roughly, us now, or them later? What matters most is the distribution of effort across time. Which generation ought to bear how much of the burden depends partly upon what exactly we think is at stake in the intergenerational allocation of burdens. This is certainly all about energy policy, but whether it has much to do with human rights depends on what one thinks human rights are like and who consequently has duties to whom. Human rights are about vulnerability and protection – individual vulnerability and social protection.[32] As Hobbes saw with almost paranoid clarity, each of us on her own is vulnerable and defenceless. We start life as defenceless infants, and many will finish it as helpless aged persons. We need help when we are ill or injured and of course if we are attacked. In general, human rights are about those who would otherwise be vulnerable to serious threats being protected by those in a position to do so. Here specifically, it is about those with influence over energy policy and the energy regime moving towards guaranteeing that coming generations can satisfy their minimum needs for energy without undermining the climatic pre-conditions of human society.

The clearest way to capture the essentials of how rights work is to reply to what I think is the most misguided critique of human rights – the classic criticism of 'atomism' derived from one understanding of Hegel. Marx formulated it in his *On the Jewish Question*, and, more recently, for example, Charles Taylor influentially adopted it.[33] Their criticism is that human rights pit individuals against one another and thereby 'atomize' the social. To think of oneself as having rights is, in effect, to say: 'this is mine – leave me alone'. Or 'I've got mine – keep your hands off'. Now there are degenerate conceptions of human rights, like extreme libertarian theories perhaps, in which rights are almost entirely a matter of negative liberty, towards which one might think one asks only non-interference, and private property, towards which one might think one needs only for people to keep their hands off, if one does not appreciate that even negative liberty and private property are actually social practices structured by social norms and laws. And any moderately rich conception of rights includes rights that consist of social protections for much more than negative liberty and private property.

32. E Ashford, 'The Duties Imposed by the Human Right to Basic Necessities' in T Pogge (ed.), *Freedom from Poverty as a Human Right* (Oxford University Press, Oxford 2007), 183–218; CR Beitz, *The Idea of Human Rights* (Princeton University Press, Princeton 2009), 106–17; Caney (n 8); JW Nickel, *Making Sense of Human Rights* (Blackwell, Oxford 2007, 2nd edn); T Pogge, *World Poverty and Human* Rights (Polity, Cambridge 2007, 2nd edn); and H Shue, *Basic Rights: Subsistence, Affluence, and U.S. Foreign Policy* (Princeton University Press, Princeton 1996, 2nd edn), 13–34 and 153–173.

33. K Marx and F Engels, *Werke*, Bd. 1 (Dietz Verlag, Berlin 1972 [1844]), 347–77 – an abridged translation is in J Waldron (ed.), *'Nonsense upon Stilts': Bentham, Burke and Marx on the Rights of Man* (Methuen, London and New York 1987), 137–50; and C Taylor, 'Atomism' in C Taylor, *Philosophy and the Human Sciences: Philosophical Papers*, Vol. 2 (Cambridge University Press, Cambridge and New York 1985 [1979]), 187–210. For analysis, see J Waldron, *Liberal Rights: Collected Papers, 1981–1991* (Cambridge University Press, Cambridge 1993), 339–69 and 380–85; and Beitz (n 32), 112–17.

In fact, the criticism of 'atomism' has everything backwards. Rights are profoundly social. A cry for one's rights is in part a plea that one's rights not be violated, but mainly campaigns for rights have in practice been demands for the protection of one's rights against those who would not respond to one's initial plea. Protection of rights consists of laws, social norms, and social practices – rights are deeply social, and they involve us with each other rather than keeping us apart. Rights are constituted by a social alliance in which individual rights and social duties are inextricably linked. A commitment to rights says: 'let's build a society in which the helpless are defended so that no one – not you, not me, and not anyone else – is simply left vulnerable to a fate that she cannot resist on her own but that we all together can resist'. This kind of understanding of rights rests, not on atomism, but on solidarity. The bearers of most rights may be single individuals, but the duties that implement the rights are embedded in social solidarity.[34]

Long before anyone began talking about climate change it was obvious that in many respects the future and its people are dependent on those of us alive now. A single generation cannot build a great university. If a particular generation is to have access to a great university, the creation and then the preservation of that university must begin in earlier generations – sometimes much earlier. Nor can a single generation of a country build a thriving economy. And they cannot in particular suddenly change the global energy regime that is now dominated by the owners of the coal, oil and gas. Indeed, Vaclav Smil, who is probably the most eminent specialist, says:

> There is only one thing that all large-scale energy transitions have in common: Because of the requisite technical and infrastructural imperatives and because of the numerous (and often entirely unforeseen) social and economic implications (limits, feedbacks, adjustments), energy transitions taking place in large economies and on the global scale are inherently protracted affairs. Usually they take decades to accomplish, and the greater the degree of reliance on a particular energy source ... the more widespread the prevailing uses and conversions, the longer their substitutions will take.[35]

The hopeful factor we can note is that never before – not in the transition from wood to coal nor the (very incomplete) transition from coal to oil and gas – has there been a broad public consensus that the transition ought to be made and that there should be a multilateral political leadership to push it forward with the power of the state. If we can build that consensus and stimulate that leadership, we may be able to make the transition from carbon to non-carbon energy somewhat more quickly. The crucial point is that if an alternative energy regime is to be available to any generation coming in the near future, the construction of that regime must begin immediately.

We today still have good choices, as Stern wants to emphasize. If this generation moves assertively to cast off the chains of the fossil fuel regime and make as rapid as possible a transition to non-carbon energy, we will be acting in the interests of ourselves, our own children, and our own grandchildren, as well as in the interests of generations of the distant future. Even more positively, we will today, it seems to me, be building a kind of

34. H Shue, 'Solidarity among Strangers and the Right to Food', in W Aiken and H LaFollette (eds), *World Hunger and Morality* (Prentice Hall, Upper Saddle River, NJ 1996, 2nd edn), 113–32; and H Shue, 'Thickening Convergence' in DK Chatterjee (ed.), *The Ethics of Assistance: Morality and the Distant Needy* (Cambridge University Press, Cambridge 2004), 217–41.
35. V Smil, *Energy Transitions: History, Requirements, Prospects* (Praeger, Oxford and Santa Barbara, CA 2010), viii.

protection for the vital interests of people in the future that is a paradigm example of protecting human rights. The best protections for human rights are protections that endure – this is why one tries to exercise one's duties by building sustainable institutions: laws, political procedures and social practices. As Simon Caney has persuasively argued, a deteriorating climate is a severe threat to some of the most basic human rights: the rights to life, subsistence and health.[36] What we now are learning from the climate scientists is that in order to protect these rights, in fact, virtually everyone must exit from the carbon economy that has dominated the globe since the Industrial Revolution. This yields the third image of our responsibilities to protect the vulnerable of the future by building the new institutions that will execute the energy transition and protect their fundamental interests against the great dangers brought by climate change through constructing an energy regime compatible with a stable climate. This is the image of *protecting rights* – the creation of enduring social protections against widespread threats to which individuals are vulnerable.[37]

The effects of climate change are not, however, the only threats to uncontroversial basic rights. Ending vast carbon emissions obviously means ceasing to burn copious amounts of fossil fuels in ways that release carbon dioxide. If the carbon industries had chosen to invest in innovative technologies like carbon capture and storage, such technologies might now be available to enable the continued use of fossil fuel but in new ways that do not release carbon dioxide. Instead, these industries have continued mindlessly to pursue their habitual policy of reserve replacement: to invest in exploring for and developing more and more new reserves of gas, oil and coal to be burned in the same primitive climate-undermining ways with no concern about the carbon pollution caused by the products they extract and sell. Since these industries have failed to invest in technologies that would enable their products to be used safely, the better policy now is probably to turn to alternative energy sources. In any case, the carbon emissions have to end so that the atmospheric concentration of carbon dioxide ceases to mushroom and exceed the cumulative carbon budget for some tolerable amount of climate change.

But one cannot, of course, simply end all energy use. If one is to eliminate most of the use of the kind of polluting energy to which one has grown accustomed, someone must develop and disseminate other affordable sources of energy (or completely different technologies for using fossil fuels in ways that do not pollute the atmosphere with carbon dioxide). If, as a matter of policy intended to protect the climate, governments simply deprive people of the energy sources with which they are familiar and which they can afford, they make it impossible for ordinary people to provide for their most elementary needs – the human population is far too large and too urbanized for us all to live as hunter-gatherers! Someone must then provide affordable alternative sources of energy. It may initially seem odd to claim that the provision of climate-friendly energy is a matter of human rights. Human rights may seem to be a matter of protections against arbitrary execution, arbitrary imprisonment and torture – and it is, of course, these things too. But if it is also a matter of protection against deprivations of subsistence needs, like deprivations of adequate food, secure shelter and clean

36. S Caney, 'Climate Change, Human Rights and Moral Thresholds' in S Humphreys (ed.), *Human Rights and Climate Change* (Cambridge University Press, Cambridge 2010), 69–90.
37. For the conception of rights as social guarantees for individuals invoked here, see Shue, 13–18 (n 32), and compare E Ashford, 'The Alleged Dichotomy Between Positive and Negative Rights' in CR Beitz and RE Goodin (eds), *Global Basic Rights* (Oxford University Press, Oxford 2009), 92–112; Beitz, 108–17 (n 32); and Nickel (n 32), 7–37.

water,[38] then one must not only (a) prevent the climate change that will otherwise deprive people of these necessities, but also (b) take away their current sources of energy for the acquisition of these necessities *only if* one supplies them with alternative sources that are enough and as good.[39] Otherwise they are left with no usable energy.

This task of creating institutions to secure individual lives against dangerous climate change while supplying the energy necessary to fulfil basic needs is no less a challenge than was the escape from oppressive and murderous rulers that, for some societies, came earlier in the history of human rights – the tentacles of the coal, oil and gas industries are at least as widespread and deep as those of any political tyranny.[40] At present it is impossible to live a normal life in a society dependent on fossil fuels without contributing to their profits and their financial strength. They have, notably, immobilized the American political system on energy policy. But the lives, subsistence and health of billions of people are under threat until we find safe and affordable alternative sources of energy, and all major nations need to contribute vigorously to the task. Accomplishing this Energy Revolution is a great human rights challenge of our time.

4 BEQUEATH THE WHIRLWIND?

To imagine that our generation could, temporally speaking, 'mind our own business' and simply leave the people of the future alone, would be at best naïve, if not a profound self-deception. We will inevitably make their world. It is not as if we will leave them a blue dress to wear, but if they do not like it, they can go out and purchase a grey one. Our generation will have left succeeding generations an international society with specific, deep social structures. The world we bequeath can be a new world fuelled by non-carbon energy or can be a perpetuation of the *status quo*: a world dominated by fossil fuels in which alliances are formed and wars are fought in order to gain access to the oil and gas that are undermining everyone's climate. The people of the future will naturally try to re-make whatever world they inherit into a better one, but a basic structure like the global energy regime cannot be transformed in a day – or even one generation, as Smil has shown. Our successors will doubtless struggle to end up in a better place, but we impose – indeed, we cannot avoid imposing – their starting place. We can make their task far easier or nearly impossible.

That starting place, determined by our generation, either will or will not protect them against their most serious threats, which we have learned in the last quarter century eminently include climate change. If we leave those in our wake with no alternatives to energy sources that emit long-lasting carbon pollution, we will have left them exposed to a socially destructive international energy regime that enriches

38. I argued for such subsistence rights in Shue (n 32). Also see Beitz and Goodin (n 37); Humphreys (n 36); and Nickel (n 32).

39. See H Shue, 'Climate Hope: Implementing the Exit Strategy' (2013) 13 Chicago Journal of International Law 381–402; H Shue, *Climate Justice: Vulnerability and Protection* (Oxford University Press, Oxford 2014, 319–39.

40. See, e.g., D Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (Simon and Schuster, London and New York 1992); N Oreskes and EM Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming* (Bloomsbury Press, London and New York 2010) 169–215; and S Coll, *Private Empire: ExxonMobil and American Power* (Penguin Press, London and New York 2012).

a comparative few owners of fossil fuel reserves and endangers billions of ordinary people. We will knowingly have left them in an unsustainable position. But the threats to the climate are threats against which adequate institutions for the delivery of safe energy can offer protection, although these institutions can be constructed only over a significant period of time. Escaping the toxic pollution of fossil fuels will require an Energy Revolution developing and disseminating alternative forms of energy – perhaps comparable to the Industrial Revolution. Fundamental revolutions take time, so they must be started long before they need to be ready. It is far past time to begin.

In order briefly to view the situation from the negative perspective, let's compare, by the metric of rights, the situation if we ourselves do not act together now to replace the carbon regime with one important aspect of the situation if we do. Stephen Gardiner, in *A Perfect Moral Storm*, has suggested an analogy.[41] In William Styron's disturbing novel, *Sophie's Choice*, a mother who is about to enter a concentration camp, accompanied by her young son and young daughter, is told by a camp guard that she can save one of her two children, but she herself must choose which one to save. Sophie physically survives the camp, but the memory of her choice between her children gradually drives her into despair, even though it was a forced choice imposed by another.

If we leave policy-makers of the next generation with only the choice between further de-stabilizing the climate on which their economy depends through additional emissions intended to keep the economy robust, and depressing their economy in order to protect the climate by avoiding additional emissions, because the only affordable energy they have is still at that late date fossil energy, we will have left them with only a 'Sophie's choice', a forced choice between terrible alternatives that will, Gardiner persuasively argues, mar their lives with the sense that they have violated rights whichever course they take. And knowing that our generation had forced that dilemma upon them, I do not see how we could then respect ourselves any more than Styron's concentration camp guard should have been able to respect himself, nor could we expect that they will look back on our generation with respect rather than contempt for our indifference towards their fate. One could think of this as our fourth and final image of the nature of the responsibility we bear, which we could call the image of imposing *forced choice among rights*.[42] Like the image of *encroachment*, this reflects a partly negative responsibility: not to leave the people of the future trapped between two bad rights-violating alternatives. The responsibility no longer concerns a competition over the consumption of shrinking carbon emissions, however, as the first two images did. And the only way to avoid imposing a forced choice between two bad alternatives is to create an affordable third one: a very-low-carbon economy.

Imposing on policy-makers, for example, a forced choice between threatening alternatives is worse than unfairly using more than one's share and encroaching on the shares of others. When one encroaches on another's share, the other gets less because one took more. When one imposes a forced choice between rights-undermining alternatives, the other is left to violate rights in one way (undercut lives by undermining the climate) or violate rights in another way (deprive people of vital energy), and, like the later Sophie, the lives of those with the decision may be marred by the haunting sense that the way in which things went wrong was their own choice – to them it will likely feel chosen, even though the alternatives between which they chose were dictated to them by the

41. The analogy is subtly probed in SM Gardiner, *A Perfect Moral Storm: The Ethical Tragedy of Climate Change* (Oxford University Press, New York 2011), 379–89.
42. Strictly speaking, this is one particular, especially egregious way to fail to protect rights, and thus one specific elaboration of the third image.

structure of the world they inherited from our generation. Elites anxious to avoid such a tragic dilemma are liable to turn to desperate measures, such as untried and potentially disastrous forms of climate engineering with rights-violating unintended consequences like disruption of the Indian monsoon.[43] And a general sense that rights are needlessly being violated by social structures that provide no good alternatives but could be different can lead to profound political change; as Reus-Smit has shown, the ignoring of rights by elites has several times led to dramatic change reaching across wide regions of the international system.[44]

Future generations will face exclusively bad choices, however, only if we make a bad choice when we have a good choice: a rapid transition away from climate-disrupting forms of energy into climate-friendly forms of energy. Indeed, those of us alive now have a golden opportunity to initiate a process that will, as Lord Stern has emphasized, benefit us and our immediate successors while providing protection for countless, more distant generations against the double threat of the dangers of on-going climate change and the deprivations of insufficient climate-compatible energy. As indicated earlier, the question of justice remains: how much of the burden of launching this great transition should the current generations bear? One can now see that because the human rights of multiple future generations are at stake, the better-off members of the current generations could reasonably be expected to make great sacrifices.

In fact, however, today we need to move beyond the primitive energy world of burning lumps of coal and igniting other fossil fuels. We ourselves are currently headed for breaching in about 26 years the cumulative carbon budget for the degree of climate change that will accompany a rise in temperature of no more than 2°C. Most of the people alive today can reasonably expect to be alive in 26 years, and their own children will be alive decades after that. Everyone in every generation needs climate change to be limited, and the only way to limit it without serious shortages of energy is to move to alternative forms of energy soon. We need to do this for ourselves and our own children, so it hardly requires unreasonable sacrifice – indeed, it requires far less than we could have been expected to do in order to protect human rights for generations. And the best news is that by pursuing our own enlightened self-interest we can avoid imposing a terrible forced choice upon more distant generations who will be left in desperate circumstances if our initiative and imagination are insufficient.

The more difficult distributive questions are within current generations. For example, many people whose jobs are dependent upon the fossil fuel industry may see their jobs ended and their lives disrupted. But it seems fairly obvious that their bad luck in being part of a technology that must be left behind should not be allowed to blight their lives, and the rest of us ought not to leave them to bear the burdens of transition alone. Coal miners, for example, must receive income support and medical insurance in the short run, as the mines are closed, and training for new jobs in the post-carbon economy in the longer run. Meanwhile, their children need to be educated for the post-carbon world in which changes in the climate slow down because carbon injections into the atmosphere stop. The rest of us ought to share fairly their burdens of transition. But since the majority will be supporting a displaced minority, the burden should be relatively light – incomparably lighter than the burdens of dealing with the unprevented effects of rapid climate change would be for those who suffer them.

43. C Hamilton, *Earthmasters*: *The Dawn of the Age of Climate Engineering* (Yale University Press, New Haven, CT 2013).
44. C Reus-Smit, *Individual Rights and the Making of the International System* (Cambridge University Press, Cambridge 2013).

A number of suggestions have been made about how to move forward on the divisive domestic and international distributive questions within current generations that are contributing to the failure so far to act decisively on climate.[45] The point here is that a failure to overcome these differences would constitute not only, negatively viewed, the heartless infliction on future generations of a completely avoidable forced choice between rights-undermining alternatives, but also, positively viewed, the fumbling of a glorious opportunity to construct an abiding international energy regime that will protect over the long run one of the vital pre-conditions of decent life. The view centred on the fourth image is an important negative caution: one ought never gratuitously to impose a bad forced choice. But the view centred on the third image presents a vision of social solidarity in which we replace the current fossil fuel energy regime (that works only for a rapidly shrinking few while undercutting the climate for all) with an alternative energy regime that serves the needs of increasingly more people, beginning with our contemporaries striving for sustainable forms of development and reaching forward through time to generations unborn.

This is energy policy, and it is economics, but it is human rights as well because this can be a social institution that provides a general social guarantee against the deprivation of something – minimum sources of climate-compatible energy – that is a widespread human need that individuals cannot satisfy on their own. We have no formulae according to which to assign responsibilities for such possibly unprecedented technological and social innovation – new energy technologies must not simply be invented but disseminated in affordable ways. By the same token we have no particular reason to exclude efforts to contribute by anyone. Human rights revolutions, which challenge and replace entrenched institutions, benefit from the broadest possible social base.[46] Everyone alive who can contribute ought to contribute what they can.

45. See, for example, H Shue, 'Face Reality? After You! A Call for Leadership on Climate Change' (2011) 25 Ethics and International Affairs 17–26; S Vanderheiden, 'Coaxing Climate Policy Leadership' (2012) 26 Ethics and International Affairs 463–79; P Christoff and R Eckersley, *Globalization and The Environment* (Rowman & Littlefield, Plymouth, UK and Lanham, MD 2013), 161–207; and A Maltais, 'Failing International Climate Politics and the Fairness of Going First' (2013) Political Studies doi:10.1111/1467-9248.12073 (online early view).
46. Reus-Smit (n 44); and NC Crawford, *Argument and Change in World Politics: Ethics, Decolonization, and Humanitarian Intervention* (Cambridge University Press, Cambridge 2002).