

NO ECOLOGICAL
SUSTAINABILITY
WITHOUT LIMITS
TO GROWTH

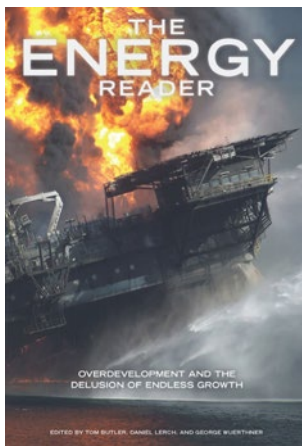
PHILIP CAFARO



post carbon institute

ABOUT THE AUTHOR

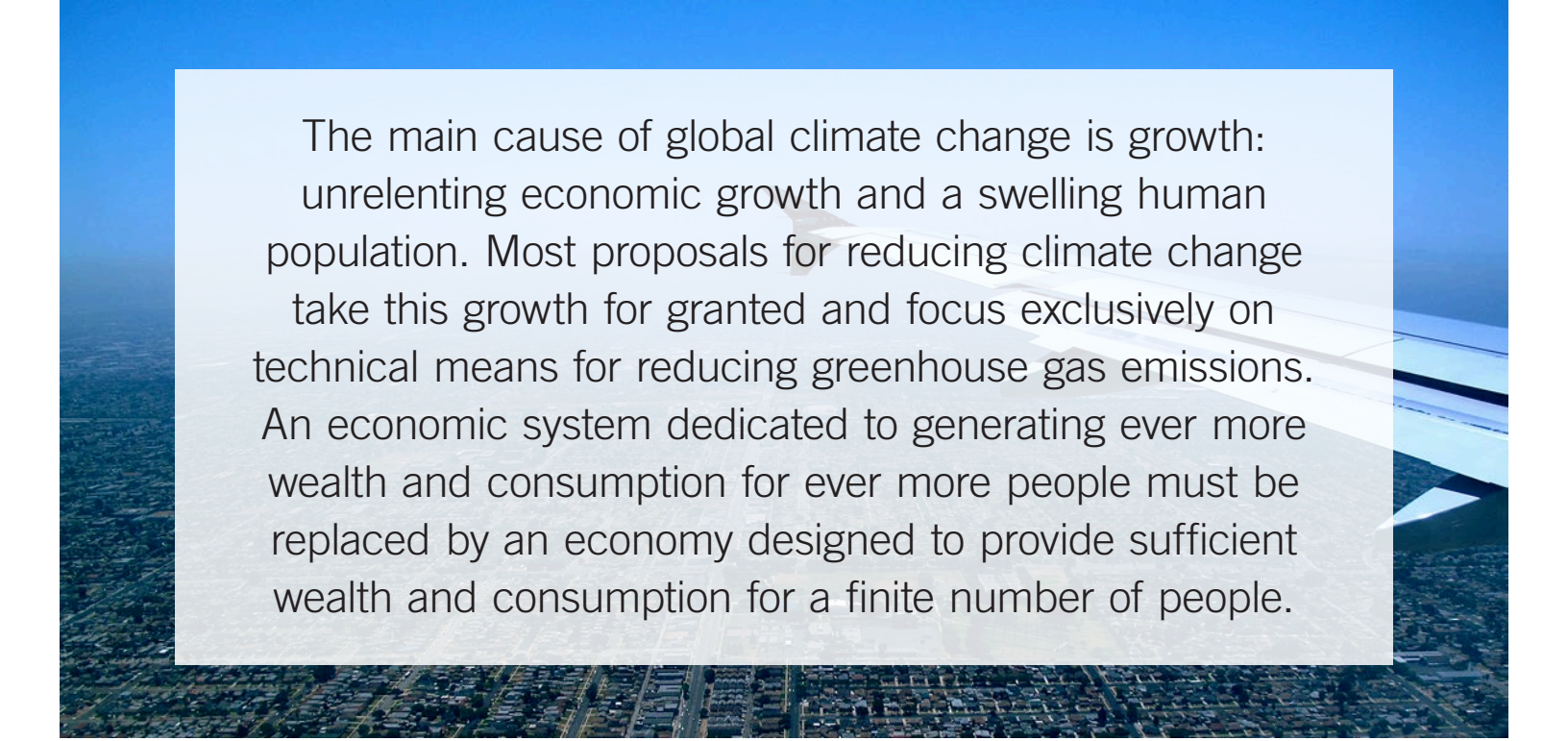
PHILIP CAFARO is a professor of philosophy at Colorado State University in Fort Collins, Colorado. His research interests center on environmental ethics, environmental policy, virtue ethics, and ethical theory. A former ranger with the U.S. National Park Service, he is the author of *Thoreau's Living Ethics: Walden and the Pursuit of Virtue*.



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The main cause of global climate change is growth: unrelenting economic growth and a swelling human population. Most proposals for reducing climate change take this growth for granted and focus exclusively on technical means for reducing greenhouse gas emissions. An economic system dedicated to generating ever more wealth and consumption for ever more people must be replaced by an economy designed to provide sufficient wealth and consumption for a finite number of people.

There is a curious disconnect in climate change discussions between explanations of the causes of global climate change and discussion of possible solutions. On the one hand, it is widely acknowledged that the primary causes of climate change are unrelenting economic growth and swelling populations. As the fourth assessment report from the Intergovernmental Panel on Climate Change (IPCC) succinctly puts it: “GDP [Gross Domestic Product] per capita and population growth were the main drivers of the increase in global emissions during the last three decades of the twentieth century... At the global scale, declining carbon and energy intensities have been unable to offset income effects and population growth and, consequently, carbon emissions have risen.”¹ On the other hand, most proposals for reducing climate change take this growth for granted and focus exclusively on technical means for reducing greenhouse gas emissions.

Climate scientists speak of the “Kaya Identity,” which describes the relation of the four primary factors that determine anthropogenic greenhouse gas emissions. These are economic growth per capita, population, energy used to generate each unit of GDP, and greenhouse gases generated per unit of energy. Over the past three and a half decades, improvements in energy and carbon efficiency have been overwhelmed by increases in population and wealth. Here are the numbers, again according to the IPCC:

The global average growth rate of carbon dioxide emissions between 1970 and 2004 of 1.9 percent per year is the result of the following annual growth rates:

- Population, +1.6 percent,
- GDP per capita, +1.8 percent,
- Energy intensity (total primary energy supply [TPES] per unit of GDP), -1.2 percent,
- And carbon intensity (carbon dioxide emissions per unit of TPES), -0.2 percent.²

Importantly, the IPCC’s projections for the next several decades see a continuation of these trends. More people living more affluently mean that under “business as usual,” despite expected technical efficiency improvements, greenhouse gas emissions will increase between 25 percent and 90 percent by 2030, relative to 2000.³ If we allow this to occur, it will almost surely lock in global temperature increases of more than 2°C over pre-industrial levels, exceeding the threshold beyond which scientists speak of potentially catastrophic climate change. I believe following this path would represent a moral catastrophe as well: the selfish over-appropriation and degradation of key environmental services by the current generation to the detriment of future ones, by rich people to the detriment of the poor, and by human beings to the great detriment of the rest of the living world.⁴

A reasonable person reading the IPCC reports and related scientific literature on climate change would likely conclude that humanity is bumping up against physical and ecological limits. Facing catastrophic global climate change, a prudent and moral response might be: *Wow! This is going to be hard. We need to start working on this problem with all the tools at our disposal. Increasing energy and carbon efficiency, to be sure. Let's get the techno-wizards working overtime on those. But also decreasing the pursuit of affluence and overall consumption, and stabilizing or reducing human populations. Maybe in the future we can grow like gangbusters again, although that's doubtful (and really, why would we want to?). But for now, people need to make fewer demands on nature and see if even our current numbers are sustainable over the long haul. After all, our situation is unprecedented—7 billion people living or aspiring to live in modern, industrialized economies—and we may already be in 'overshoot' mode.*

Such convictions would only be strengthened by considering further evidence of global ecological degradation from the 2005 *Millennium Ecosystem Assessment* (MEA), including the depletion of ocean fisheries, accelerating soil erosion, ongoing species extinctions throughout the world, the growth of immense “dead zones” at the mouths of many great rivers, and more. According to the MEA, humanity is currently degrading or utilizing unsustainably 15 of 24 key ecosystem services.⁵ For the morally obtuse, a visit to Appalachia's ravaged mountains and streams, or Alberta's degraded tar sands mining areas, or Louisiana's oil-soaked marshes might provide further incentive for change.

However, neither global warming nor the worldwide damage of fossil fuel production has led to a widespread reevaluation of the goodness of growth.⁶ Regarding climate change, we have seen a near-total focus on technological solutions by politicians and even by scientists and environmentalists, who should know better.

Numerous illustrations can be cited from the IPCC's fourth assessment report itself. Its authors recognize agriculture as a major contributor to global climate change, for example. Yet they simply accept projections for greatly increased demands for all categories of

agricultural products (including a doubling in worldwide demand for meat over the next fifty years) and focus on changes in tillage, fertilizer use, and the like as means to limit increased greenhouse gas emissions.⁷ Similarly, the assessment report notes that among significant greenhouse gas sources, aviation traffic is the fastest-growing sector worldwide. It considers numerous changes to aviation practices, including relatively trivial improvements in airplane technology and changes in how high planes might fly on particular routes, while avoiding the obvious alternative of reducing the number of flights.⁸ Many similar examples could be given.

All this is a serious mistake. Because “business as usual” with respect to growth undermines our attempts to avoid catastrophic global climate change or meet our other global ecological challenges, we almost certainly need to slow or end growth. “Can advances in science and technology prevent global warming?” asks Pacific Northwest National Laboratory scientist Michael Huesemann in a recent review article of the same name. After detailed analysis, he answers that an exclusive focus on efficiency improvements is unlikely to prevent catastrophic climate change. Indeed: “It is highly questionable that 12-fold to 26-fold increases in Gross World Product [over the twenty-first century, as predicted by the IPCC] are even remotely achievable because of biophysical constraints and the inability of technology to sufficiently uncouple energy and materials use from the economy.”⁹

Meeting the climate change challenge depends on ending human population growth and either ending economic growth or radically transforming it, so that some economic growth in *some* sectors of the modern economy and in poorer countries that actually benefit from it can be accommodated without radically destabilizing Earth's climate. All the technological improvements we can muster will probably be necessary to enable this transition to a slow-growth or post-growth future—they cannot provide an alternative to it.¹⁰ But making the necessary changes will be difficult; particularly in America, where economic growth comes close to being a sacred value.

CLIMATE CHANGE RHETORIC AND REALITY

Consider the rhetoric around popular efforts to encourage action on global climate change. Mass initiatives like Focus the Nation and Al Gore's Wecansolveit.org are morally earnest, yet cheerily optimistic. They emphasize that the climate challenge is manageable and can be met without drastically altering standards of living. In fact, they claim, climate change is chock-full of economic opportunities! In a section on their website proposing "Solutions" for a "Clean Energy Economy," Wecansolveit.org exclaims: "Thousands of new companies, millions of new jobs, and billions in revenue generated by solutions to the climate crisis—this is the clean energy economy we can adopt with today's technologies, resources, know-how, and leadership from our elected officials." Furthermore: "A recent report showed that investment in a clean and efficient economy would lead to over three million new green-collar jobs, stimulate \$1.4 trillion in new GDP, add billions in personal income and retail sales, produce \$284 billion in net energy savings, all while generating sufficient returns to the U.S. Treasury to pay for itself over ten years." They conclude: "This is the opportunity of our generation—to lead the transformation to an economy that is robust without causing environmental harm."

Now, don't get me wrong. There are often good practical reasons to be optimistic in tone and emphasize the economic positives in talking to our fellow citizens. If the only way for Americans to do our part to stop global climate change is to give up our cars or keep our houses heated to 55 degrees during the winter, I don't think we'll make the effort. Fortunately, Al Gore and other optimists are right that many of the steps needed to limit greenhouse gas emissions will save us money and that the new energy technologies we need to develop and deploy can be growth industries for the U.S. economy. Similarly, estimates that the world might meet the global climate challenge by devoting only 2 percent of world GDP to the effort (as suggested in the famous 2005 Stern Report) really do give grounds for optimism.¹¹

Above all, the "positive" approach recommends itself

because it has led to some successes. For example, in my home state of Colorado, we have—through a direct citizens' referendum and subsequent government action—committed the state to billions of dollars of new investments in alternative energy in the next decade. We didn't achieve this by hanging crepe, but by combining moral exhortation with optimism. "Global warming is our generation's greatest environmental challenge," states Governor Bill Ritter, in his 2007 introduction to the *Colorado Climate Action Plan*. "Can Coloradans really make a difference? I believe we can, and that we have a moral obligation to try... [Our] success depends on everyone doing his or her part. We can reduce global warming and keep our economy strong and vibrant. This is an exciting time for Colorado as we look toward an expanded New Energy Economy with new jobs, new businesses and new investments."¹² Colorado's plan is one of the most far-reaching alternative energy mandates in the United States. Score a point for the power of positive thinking.

However, this approach engenders two worries. First, it probably cannot support all the measures needed to adequately address the problem. What happens when mitigating global climate change doesn't save us money or contribute to growth, but instead costs us money or inhibits growth? Second, this approach's boosterism seems likely to further solidify the economic paradigm that is causing climate change and the rest of our environmental problems in the first place, and further entrench the economic mind-set that makes it so difficult to solve them. Can we really "expand" our economies and keep them "vibrant and strong" (i.e., growing even more) while also "reducing" global warming? Can an economy really be "robust" [that is, rapidly growing] without causing environmental harm?

The evidence suggests not. It suggests that the most important economic lesson climate change has to teach us is that the endless growth economy is unsustainable and must be replaced by a fundamentally different alternative. An economic system dedicated to generating ever more wealth and consumption for ever more people has reached its limits. It must be replaced by an economy designed to provide sufficient wealth and

consumption for a finite number of people.¹³ Our failure to recognize this testifies to the authority of the reigning economic orthodoxy; to the power of wishful thinking; and to our failure to grapple with the full meaning of climate change.

After all, what is global climate change? We are cooking the Earth, radically destabilizing the climate of the only home we or our descendants will have (at least for the foreseeable future). We are doing this at great risk to ourselves and great cost to the other species with whom we share this planet.

How are we creating global climate change? Not by accident, now, but consciously, as a by-product of ever more human economic activity.

Why are we creating global climate change? Because we believe—or act as though we believe—that ever more economic activity is the key to living good human lives. Or because we believe that there is no real alternative to ever more economic activity: either that it is as inevitable as Newton's laws of motion or that the alternatives are so dismal that we could never accept them. So, in responding to climate change, the assumption so far has been that we can continue to have growing economies while generating less greenhouse gas emissions, as long as we make some (perhaps difficult or costly) technological and managerial changes. But this assumption becomes less plausible with each year's reports of melting tundra and receding glaciers.

In the short term, we might make impressive strides in lowering the greenhouse gas emissions of various human activities (driving, providing electricity for our homes, etc). But there are also limits to how far we can push down these emissions: technical limits, economic limits, physical limits, and the limits associated with human inertia. Meanwhile, all else being equal, more people mean more greenhouse gas emissions and wealthier people mean more greenhouse gas emissions. The “Environmental Kuznets Curve”—in which societies, once they become sufficiently rich, start to “purchase” increased environmental protection and clean up their messes—is a very comforting

idea; but studies show it does not hold for global climate change.¹⁴ So, under the endless growth status quo, all our economic successes make ending climate change more difficult.

In the long term, it seems clear that an ever-growing economy—with more people consuming more, producing more goods and services per capita, and generating ever more wealth—will sooner or later lead to dangerous global climate change. Unless you imagine a way of life that creates *no* greenhouse gas emissions per capita, you have to accept that at some point continued growth in population, consumption, and production will generate dangerous greenhouse gas emissions and catastrophic climate change.

But OK. Let's go ahead and imagine a benign, post-fossil fuel economy where people generate no greenhouse gases at all. Even in this advanced state, shouldn't we assume that an endlessly growing human economy will create other strains on basic ecosystem services and generate other intolerable environmental costs? No one anticipated stratospheric ozone depletion as a by-product of the growing world economy; almost no one anticipated global climate change. One of global warming's main lessons should be that we are likely not at the end of this career of unanticipated consequences. Remember, according to the *Millennium Ecosystem Assessment*, currently 15 of 24 key global ecosystem services are being degraded or used unsustainably. Climate change is not the only area where humanity is pushing up against global ecological limits.

Let's further assume that we can continue to grow indefinitely and somehow avoid ecocatastrophes like ozone depletion and global climate change. Even then, ever more people consuming and producing ever more stuff will certainly require the continued taming of the Earth, the loss of wildness, and the continued displacement of nonhuman species. Some of us rank these trends right up there with climate change as ecological and moral disasters.¹⁵ Many proposed responses to climate change, from seeding the oceans with iron to covering the Earth with solar collectors to floating vast armadas of balloons up into the stratosphere, would

move humanity further toward a bland technological utopia in which we press every acre of land (and even the depths of the seas and the heights of the atmosphere) into service to our vast needs, turning Earth into an artificially controlled human life-support system, while totally displacing wild nature. This would constitute a monstrous injustice toward the rest of life on Earth—and a dangerous bet on our own foresight and technological abilities.

What all this suggests is that sooner or later (and in any case not all that much later) we are going to have to shift out of the endless growth paradigm if we hope to avoid the worst of global climate change, meet our other environmental challenges, share habitat and other resources fairly with other species, and in general act responsibly and live up to our self-proclaimed moniker *Homo sapiens*: man the wise. The good news is that planet Earth is a wonderful, richly endowed planet and human beings are resourceful and adaptable. We have good reason to believe that Earth can support a few billion people sustainably, in comfort and over the long term. But only if we aren't too greedy! Only if we accept limits to growth.

ENDNOTES

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- 3 Ibid., 111.
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- 12 Bill Ritter Jr., *Colorado Climate Action Plan: A Strategy to Address Global Warming* (Denver: Office of the Governor of Colorado, November 2007), 2, <http://www.cdphe.state.co.us/ic/coloradoclimateactionplan.pdf>.
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