Sustainability, Well-Being, and Economic Growth

by RICHARD B. HOWARTH

> If the earth must lose that great portion of its pleasantness which it owes to things that the unlimited increase of wealth and population would extirpate from it, for the mere purpose of enabling it to support a larger, but not a better or a happier population, I sincerely hope, for the sake of posterity, that they will be content to be stationary, long before necessity compels them to it.
>
> —John Stuart Mill, Principles of Political Economy, 1848

INTRODUCTION

The relationship between economic growth, human well-being, and the achievement of a sustainable future has a long and complex intellectual history. In his 1910 book *The Fight for Conservation*, for example, the American conservationist Gifford Pinchot emphasized:

> the right of the present generation to use what it needs and all it needs of the natural resources now available [recognizing] equally our obligation so to use what we need that our descendents shall not be deprived of what they need.[1]

This language strikingly anticipates the seminal work of the World Commission on Environment and Development (WCED), which defined "sustainable development" as a process that "meets present needs without compromising the ability of future generations to meet their own needs."[2] This approach is strongly bottom-up—it suggests that a sustainable future will come into being if the biophysical and social conditions needed to support economic activity and human flourishing are maintained from each generation to the next. In addition, it emphasizes meeting needs rather than promoting growth or satisfying consumer preferences as the defining characteristic of "development." Importantly, the WCED attaches a strong emphasis to issues of equity, especially the goal of alleviating poverty in settings and societies where people's objective needs remain unmet.[3]

A contrasting perspective on the challenge of reconciling economic activity, social welfare, and the needs of future generations was put forward by Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens, III, in their 1972 book, *The Limits to Growth*.[4] Based on a dynamic simulation model in which businesses and households make myopic decisions without regard for the long-run implications of short-run production and consumption, Meadows et al. predicted that natural resource depletion and environmental degradation would lead to an irreversible collapse of the global economy by the early twenty-first century. In this analysis, avoiding catastrophe would be possible if and only if:

1. Human fertility was limited to the replacement rate to stabilize population.
2. Natural resource use and pollution per unit of in-

dustrial output was cut by at least 75 percent.
3. Industrial production was stabilized at the level prevailing in the late twentieth century.
4. Goods and services were redistributed from the rich to the poor to provide a high quality of life for all members of the global community.

This vision is fascinating in multiple respects. It is simultaneously dystopian and utopian, presenting a narrative that combines an apocalyptic warning with the possibility of a type of secular renewal achieved through a process of personal and (especially) collective transformation. Like Pinchot and the WCED, this vision emphasizes the need to conserve natural resources and ecosystems as the foundation of a sustainable future, combined with the need to redistribute wealth to achieve equity in an ecologically limited world. Unlike the WCED, however, Meadows et al. present the seemingly straightforward argument that, because economic growth is the perceived driver behind resource depletion and environmental degradation, the cessation of economic growth should be embraced an operational objective in the attainment of sustainability.

Although its influence on current research on the economics of sustainability is mainly historical, [5] the legacy of *The Limits to Growth* study continues to have very considerable implications for environmental policy, in part because of the powerful appeal of the study's "apocalypse-or-renewal" rhetorical framing in the context of the contemporary sustainability movement. In debates over climate change, for example, environmentalists sometimes argue that, because the production and consumption of market goods and services is the proximate cause of greenhouse gas emissions, stabilizing climate will require some curtailment or even the reversal of economic growth.[6] In response, critics argue that, because economic growth is fundamental to the improvement of human welfare, policies that negatively affect economic growth are unworkable and undesirable.[7] This contextualization of the issue has led to policy gridlock grounded in an underlying ideological disagreement.

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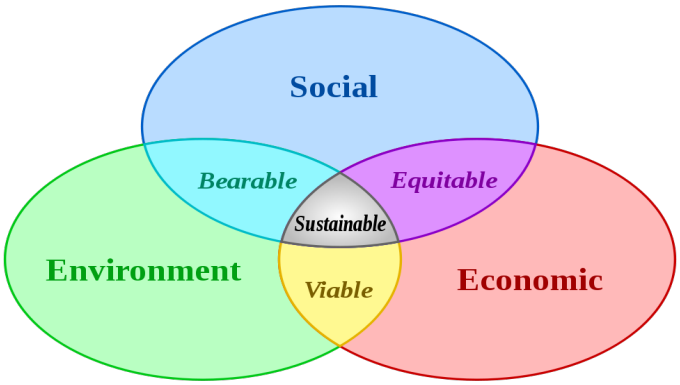
The present paper will address these issues by advancing two separate yet interrelated arguments, focusing especially on the example of climate change.



"Sustainable Development" by: Johann Dréo

First, I will argue that the perception that there is a hard tradeoff between the goals of economic growth and environmental sustainability rests on a contestable empirical premise. While it is of course true that the transition from a high-carbon to a low-carbon energy economy would carry positive economic costs, a large body of literature in the fields of engineering and economics establishes that those costs would be too small to substantially affect the overall rate of economic growth. A good case can be made that failing to stabilize climate poses a major risk to the livelihoods of future generations. But capping growth may not in itself be necessary to alleviate the risks posed by today's production and consumption patterns.

Second, I will argue that the premise that economic growth necessarily leads to an enhanced quality of life and improved human flourishing in high-income societies is also problematic from a social science perspective. As Herman Daly argued in his landmark book *Steady-State Economics*,[8] economic growth provides a mix of benefits and costs in terms of its contribution to human well-being. In poor societies, growth can provide material goods that can satisfy urgent needs given just institutions that allocate goods and services to the impoverished. In affluent societies, however, growth generates a complex set of social and environmental costs, explaining why surveys of life satisfaction have remained largely unchanged in industrial societies despite the large increase in production and

consumption that has occurred since World War II.[9]

Taken together, these arguments suggest that the contestation over what Daly termed "growthmania" presents a rather delicate set of issues.[10] On the one hand, a narrow emphasis on growth can and sometimes does lead to a failure to implement policies even in cases where the long-run benefits exceed the short-run costs as measured using conventional economic tools.[11] On the other hand, presenting growth as the core problem and the cessation of growth as the solution may actually serve to reinforce the political influence of the pro-growth narrative, since it forces decision-makers to frame things in terms of an either/or choice. Instead, environmentalists may be better served by the WCED approach to sustainable development, which decenters growth to focus more directly on the achievement of social justice and the conservation and protection of ecosystem services. This hardly implies that unlimited growth is possible or desirable, though it provides a framework for balancing the costs and benefits of growth and for directing goods and services to ends that best reflect society's values.

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CLIMATE STABILIZATION AND "DEGROWTH"

The notion that stabilizing climate might require reductions in the levels of material production and consumption is one facet of the rapidly evolving "degrowth" movement.[12] This perspective notes (rightly) that greenhouse gas emissions tend to increase with the level of economic activity because higher income and consumption levels translate into increased demand for carbon-intensive goods. An analogous argument, however, is offered by analysts who favor free-market energy policies over the interventionist policies needed to put the economy on course towards the achievement of a sustainable energy system. The argument is that the production of goods and services requires energy and that cutting energy use—or shifting toward higher-cost forms of energy—necessarily threatens to reduce the level and growth of economic output.[13] As one example of this line of reasoning, the U.S. Energy Information Administration (USEIA) predicted that implementing the Kyoto Protocol would reduce U.S. economic output by up to 4.3 percent in the year 2010.[14] That estimate played powerfully into the anti-Kyoto rhetoric that was already prevalent in Washington political circles. In 2002 speech, for example, President George W. Bush argued that:

> The approach taken under the Kyoto Protocol would have required the United States to make deep and immediate cuts in our economy to meet an arbitrary target. It would have cost our economy up to $400 billion and we would have lost 4.9 million jobs.[15]

Because claims of this sort have major policy implications, it is fair to ask whether they hold up under scrutiny. On this point, the research literature depicts a more complex and subtle set of relationships.[16] For one thing, the USEIA study found that well-designed policies could achieve the goals of the Kyoto agreement at a substantially lower cost. The 4.3 percent output loss occurred in a single year based on the assumption that emissions cuts were implemented precipitously in a way that failed to limit costs through measures designed to achieve a smooth and efficient transition.

A more representative assessment is provided by the Stern Review on climate change,[17] which found that stabilizing atmospheric carbon dioxide concentrations at 500–550 parts per million—a level sufficient to limit the future increase in mean global temperature to roughly 2 degrees Celsius—would impose costs equivalent to a permanent 1 percent reduction in the level of present and future economic output. This is a number that needs to be viewed in perspective. One key point is that achieving Stern's stabilization target would require a gradual but also nearly complete transition away from today's high-carbon energy economy

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to a mainly post-carbon energy system over the course of the next four decades. This is in line with the goal of reducing U.S. greenhouse gas emissions by 80 percent by the year 2050, which Barack Obama embraced during the 2008 presidential campaign. It also consistent with Daly's concept of "scale," which calls for limiting material throughput (i.e., the use of natural resources and the discharge of waste) to levels that are ecologically sustainable given the dynamics of biophysical systems.[18]

A second point is that a 1 percent reduction in economic output would involve an annual cost of roughly $150 billion per year in the context of the current U.S. economy. That is a substantial impact that should not be borne without good reason. On the other hand, Stern's analysis implies that climate change policies would have almost no impact on the rate of economic growth. Because climate change policies would be phased in gradually over time, an economy that might have grown at a rate of 3.00 percent per year would instead grow at the lower rate of 2.95 percent per year if one assumed that climate policies had costs in the middle of the range described by the Intergovernmental Panel on Climate Change in its systematic literature review.[19] This effect is so small that it would be difficult to distinguish from the year-to-year variability in growth that is driven by fluctuating trends in technology, human behavior, and other fundamental drivers. As the Nobel Prize winning economist Thomas Schelling once framed this point:

> If someone could wave a wand and phase in, over a few years, a climate mitigation program that depressed [U.S.] GNP by two percent in perpetuity, no one would notice the difference.[20]

Why are the impacts of climate policies on the rate of economic growth predicted to be small? One reason is that engineering studies have shown that a wide variety of low-cost emissions abatement technologies are currently available or projected to become available given appropriate investments in research, development, and technology diffusion. A recent study by McKinsey and Company, for example, identified a set of specific technologies sufficient to reduce U.S. greenhouse gas emissions in the year 2030 by up to 46 percent at a maximum cost of $50 per tonne of CO2 equivalent, or 44 cents per gallon of gasoline.[21] This cost is greater than zero but far too small to have major impacts on the overall level of economic activity. A carbon dioxide tax of $50 per tonne would favor lower-emission technologies and a shift towards low-carbon goods and services. The problem, then, is not a lack of technical potential but a lack of policies and price signals that promote the transition to a green energy system.

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Second, energy economists have long stressed that the relationship between energy use and economic output is flexible and elastic, especially in the long run.[22] It is certainly true that the production of all goods and services involves physical transformations that require inputs of energy as stipulated by the laws of thermodynamics.[23] It is also true, however, that the current economy is far from its thermodynamic limits and that large reductions in carbon dioxide emissions could be achieved through changes in technology, the structure of the economy, and the mix of final products that consumers demand. We demand high-carbon goods because fossil fuels remain cheap and because current market prices do not reflect the costs that climate change will impose on ecosystems' future generations. It does not, however, follow that transition to a low-carbon economy would require major changes in the standard of living, noting that gross domestic product (GDP), is a measure of subjective value and that the level of value per unit of energy or material throughput can be increased substantially within the limits set by human psychology and the laws of thermodynamics.

A related and important point is that climate stabilization may be viewed as an investment in ecological capital that will provide a stream of long-run economic benefits. While the Stern Review projects that stabilizing climate would reduce short-run economic

output by roughly 1 percent, it also concludes that failing to stabilize climate would impose long-run economic damages equivalent to a permanent 5–20 percent reduction in consumption and income, now and forever.[24] This conclusion is controversial because it relies on the moral judgment that equal weight should be attached to the welfare of present and future generations.[25] That said, Stern's conclusion that climate stabilization would boost long-run prosperity is a common finding in the literature, even in models that do not account for the role that climate stabilization can play in reducing low-probability, catastrophic risks to future lives and livelihoods.[26]

GROWTH AND WELL-BEING

I have argued that climate stabilization could be achieved without large impacts on the rate of short-run economic growth and that, in the long run, the result would be a world of enhanced life opportunities for members of future generations. But suppose, for the sake of argument, that we rejected this claim in favor of the proposition that achieving ecological sustainability would require substantial reductions in future economic growth. What could we then say about the likely impacts on human well-being?

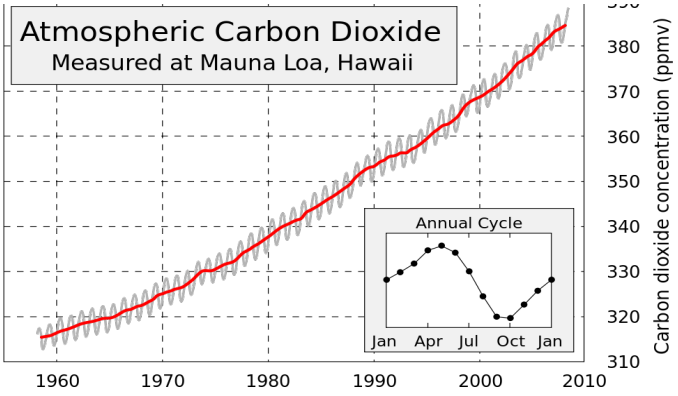
From the perspective of mainstream economics, the answer seems clear-cut: The consumption of material goods and services satisfies people's preferences and contributes to their happiness, and higher levels of consumption should—all else equal—contribute positively to social welfare. The "all else equal" caveat is quite important here. While non-economists sometimes assume that mainstream economics is concerned narrowly with the monetary value of market goods and services, in fact, economics textbooks very much stress the contributions that public goods and environmental quality make to human well-being. The question is, then, how the benefits of improved environmental quality compare with the costs of reduced private consumption.

On this front, authors such as Daly and John Cobb[27] have produced a very striking conclusion. Building on the earlier work of William Nordhaus and James Tobin,[28] Daly and Cobb's Index of Sustainable Economic Welfare (ISEW) presents a monetary measure of social welfare that accounts for:

- the consumption of private goods and services bought and sold on markets;
- the social costs of inequality;
- the value of non-market production (household work, family care, and volunteer work);
- environmental degradation;
- "defensive expenditures" (i.e., the cost of protecting oneself from environmental harms);
- net capital investment; and
- natural resource depletion.

Focusing on U.S. data, Daly and Cobb found that trends in the ISEW closely paralleled changes in GDP per capita in the 1950s and 1960s. In later years, however, the relationship between income and welfare became de-coupled. While GDP per capita grew at a rate of 2.2 percent per year between 1970 and 2000, an updated version of the ISEW remained virtually unchanged.[29]

The numerical aspects of the ISEW and related measures are not without controversy. Eric Neumayer, for example, argues that trends in the ISEW



Atmospheric carbon dioxide concentrations as measured at Mauna Loa, Hawaii"

are driven disproportionately by rising inequality and greenhouse gas emissions and that Daly and Cobb's approach to measuring these effects is ad hoc.[30] In counterpoint, other authors have sought to ground the ISEW on a more refined theoretical and empirical foundation.[31] The literature on this topic points to a widening gap between the ISEW and GDP growth in a broad range of nations.[32]

Further insights arise from studies of subjective well-being—i.e., people's self-reported life satisfaction as measured by comprehensive social surveys. In a landmark paper, Richard Easterlin considered data from a diverse set of industrialized and developing nations, finding that: (a) in any given country at any point in time, individuals with higher incomes report higher

life satisfaction than those with lower incomes; but (b) there was no correlation between average income in a country and average life satisfaction.[33] Subsequent research has shown that point (b) is only partly correct.[34] In low-income societies, economic growth translates into large gains in life satisfaction if the resources

"Escape" by Marc Dejong.

generated by growth are used to satisfy people's basic needs. But in high-income societies, economic growth generates diminishing marginal returns, so that large increases in production and consumption have almost no effect on average well-being in society. Still, a concern for relative economic status can lead people to pursue higher income and consumption levels even when, from a social perspective, these activities generate negative costs of the kind measured by the ISEW.[35] Since these costs are excluded from the standard measure of economic output, it is not surprising that the economic growth that has occurred in the United States since 1970 has not been matched by a corresponding increase in ISEW or subjective well-being.

In standard economic theory, individuals' preferences are assumed to be fixed and independent of social context. In his book Social Limits to Growth, in contrast, Fred Hirsch argued that private consumption generates social externalities that are analogous to the costs imposed by pollution.[36] If individuals' well-being depends on their relative consumption, then an increase in one person's consumption serves to reduce (if by just a little) the welfare of all other members of society. Stated somewhat differently, all individuals face pressures to maintain high income and consumption levels to avoid falling behind in relative terms. The paradox is that nobody thereby gets ahead, while all of us would be better off if scarce social resources were reallocated to increased leisure, environmental quality, and the benefits of community life.

After reviewing the empirical support for this hypothesis based on data on subjective well-being, economic experiments, and observed behavior in labor markets, Robert Frank[37] argues that the social costs of "conspicuous consumption"[38] should be internalized through a graduated consumption tax with a top tax rate of 90 percent (meaning a tax of 90 cents for each dollar of private consumption). This tax is precisely analogous to the concept of a Pigovian pollution tax. It would provide an incentive signaling the full social cost of private decisions that would serve to align individual self-interest and community well-being.

What are the implications of Frank's approach for balancing the economy, human welfare, and environmental quality over the long term? In answering this question in our book, *Status, Growth, and the Environment: Goods as Symbols in Applied Welfare Economics*, Kjell Arne Brekke and I analyze a numerical model in which a concern for relative economic status leads people to engage in excess private consumption at the expense of reduced leisure (a surrogate for time allocated to family life and other non-market activities) and the environment (measured in terms of long-run climate change).[39] In this model, greenhouse gas emissions would more than double over the course of the twenty-first century in the absence of climate change mitigation measures. If one ignored the social costs of consumption externalities, then standard cost-benefit analysis would justify emissions reductions of no more than 9 to 15 percent relative to baseline levels, with no appreciable impact on economic growth or the amount of time allocated to paid labor.

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Given plausible assumptions about the importance of social status in motivating behavior, however, Brekke and I found that substantially larger emission reductions were economically justified. More tellingly, the introduction of an optimal tax to balance the private benefits and social costs of consumption would support a 19 to 25 percent reduction

in consumption levels and a 25 percent increase in the enjoyment of leisure. These quantitative finds should be interpreted with care—following Nordhaus,[40] the model is based on the contestable assumptions that climate damages are relatively modest and that society attaches a relatively low degree of weight to the welfare of future generations.[41] Still, these results anchor an important, qualitative conclusion: There is good reason to believe that efficiently designed policies that reduced private consumption in order to increase both leisure and environmental quality would serve to increase human well-being, at least in affluent societies where material goods are abundant and where social goods and environmental quality are scarce.

CONCLUSIONS

In this paper, I have argued that accepting substantial reductions in the future rate of economic growth may be unnecessary to safeguard and sustain the biophysical systems that provide the basis and underpinnings for human livelihoods and well-being. In the long run, the growth of material production and consumption is limited by natural resource constraints, and achieving a sustainable future will require policies and institutions that maintain the economy within the bounds set by nature. But significant growth of GDP—a measure of the subjective value of goods and services—can nonetheless be achieved in the interim through a move to technologies and consumption patterns sufficient to sharply reduce the economy's "ecological footprint."[42]

This finding is in one sense good news for environmentalists. In a growth-oriented society, it provides an answer to critics who warn that the costs of achieving ecological sustainability would put the economy at risk. On the contrary, authors such as Stern conclude that the benefits of stabilizing the earth's climate will exceed the costs by a factor of five to twenty, even when the focus is on narrow economic benefits.[43]

I have also argued that continued growth—while ecologically feasible up to a point set by ultimate thermodynamic and technological limits—may generate social costs that exceed the private benefits in affluent societies where the resources exist to meet people's basic needs unless specific policies are implemented to address these impacts. This point is supported by data on trends in the Index of Sustainable Economic Welfare, subjective well-being, and a wide variety of social and environmental indicators. In the pursuit of growth, our society has told itself that our social and environmental values are too expensive to afford. The result is a systematic imbalance that, as John Kenneth Galbraith once argued,[44] has brought into being a world of "private opulence and public squalor" through an overemphasis on growth, markets, and our identities as consumers that has crowded out our human roles as citizens, community members, caretakers, and friends.

The way forward is perhaps not so very hard to envision. A sustainable future will emerge if we build institutions that, on a practical level, sustain the natural environment and the social and technological conditions that will empower future generations to define and pursue their own conception of the good life. As the Nobel Prize winning economist Amartya Sen wrote in his book *Development as Freedom*,[45] the path to enhanced human flourishing will be built by expanding the scope of choices and opportunities. While policies that promote sustainability may well lead to (some, but not unlimited) economic growth, the converse is certainly not assured. As the WCED framed this point, achieving sustainability will require an approach that de-emphasizes growth and that explicitly embraces environmental and social goals as a core and self-standing dimensions of "development."[46]

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NOTES

1. G. Pinchot, The Fight for Conservation (New York: Doubleday, Page and Company, 1910), 80.
2. World Commission on Environment and Development, Our Common Future (New York: Oxford University Press, 1987), 43.
3. See C. Sneddon, R.B. Howarth, and R.B. Norgaard, "Sustainable Development in a Post-Brundtland World," Ecological Economics 57 (2006): 253-68.
4. D.H. Meadows, D.L. Meadows, J. Randers, and W.W. Behrens, The Limits to Growth (New York: Universe Books, 1972); see also D.H. Meadows, J. Randers, and D.L. Meadows, Limits to Growth: The 30-Year Update (White River Junction, VT: Chelsea Green Publishing, 2004).
5. See J. Pezzey, "Sustainability: An Interdisciplinary Guide," Environmental Values 1 (1992): 321-62; and E. Neumayer, Weak vs. Strong Sustainability (Cheltenham, U.K.: Edward Elgar, 2004).
6. See P.A. Victor, "Growth, Degrowth, and Climate Change: A Scenario Analysis," Ecological Economics, in press, published online May 27, 2011.
7. B. Lomborg, The Skeptical Environmentalist: Measuring the Real State of the World (New York: Cambridge University Press, 2001).
8. H.E. Daly, Steady-State Economics (San Francisco, CA: W.H. Freeman and Company, 1977); see also H.E. Daly, Beyond Growth (Boston, MA: Beacon Press, 1996).

9. R.A. Easterlin, "Does Economic Growth Improve the Human Lot?" in Nations and Households in Economic Growth: Essays in Honor of Moses Abramovitz, ed. P.A. David and M.W. Reder (New York: Academic Press, 1974); see also R.A. Easterlin, L. Angelescu McVey, M. Switek, et al., "The Happiness-Income Paradox Revisited," Proceedings of the National Academy of Sciences 107 (2010): 22463-68.
10. H.E. Daly, "Steady-State Economics vs. Growthmania: A Critique of Orthodox Conceptions of Growth, Wants, Scarcity, and Efficiency," Policy Sciences 5 (1974): 149-67.
11. See N. Stern, The Economics of Climate Change: The Stern Review (New York: Cambridge University Press, 2007).
12. See F. Schneider, G. Kallis, and J. Martinez-Alier, "Crisis or Opportunity? Economic Degrowth for Social Equity," Journal of Cleaner Production 18 (2010): 511-18.
13. Lomborg, The Skeptical Environmentalist.
14. U.S. Energy Information Administration, "Impacts of the Kyoto Protocol on U.S. Energy Markets and Economic Activity" (Washington, DC: U.S. Department of Energy, 1998).
15. See T. Barker and P. Ekins, "The Costs of Kyoto for the U.S. Economy," Energy Journal 25 (2004): 53-71.
16. J.P. Weyant and J.N. Hill, "Introduction and Overview," in The Costs of the Kyoto Protocol: A Multi-Model Evaluation, ed. J.P. Weyant, Energy Journal 20, special issue (1999): vii-xliv.
17. Stern, The Economics of Climate Change.
18. H.E. Daly, "Allocation, Distribution, and Scale: Towards an Economics That Is Efficient, Just, and Sustainable," Ecological Economics 6 (1992): 185-93.
19. Intergovernmental Panel on Climate Change (IPCC), Climate Change 2007: Mitigation of Climate Change (New York: Cambridge University Press, 2007).
20. T.C. Schelling, "The Cost of Combating Global Warming: Facing the Tradeoffs," Foreign Affairs 76 (1997): 8-14.
21. J. Creyts, A. Derkach, S. Nyquist, et al., "Reducing U.S. Greenhouse Gas Emissions: How Much and at What Cost? U.S. Greenhouse Gas Abatement Mapping Initiative," executive report (New York: McKinsey and Company, 2007).
22. W.W. Hogan and A.S. Manne, "Energy-Economy Interactions: The Fable of the Elephant and the Rabbit?" Modeling Energy-Economy Interactions: Five Approaches, ed. C.J. Hitch (Washington, DC: Resources for the Future, 1977).
23. N. Georgescu-Roegen, The Entropy Law and the Economic Process (Cambridge, MA: Harvard University Press, 1971).
24. Stern, The Economics of Climate Change.
25. See J. Broome, "The Ethics of Climate Change," Scientific American 298 (2008): 97-102.
26. See M.L. Weitzman, "On Modelling and Interpreting the Economics of Catastrophic Climate Change," Review of Economics and Statistics 91 (2009): 1-19; M.D. Gerst, R.B. Howarth, and M.E. Borsuk, "Accounting for the Risk of Extreme Outcomes in an Integrated Assessment of Climate Change," Energy Policy 38 (2010): 4540-48.
27. H.E. Daly and J.B. Cobb, For the Common Good: Redirecting the Economy Toward Community, Environment, and a Sustainable Future (Boston, MA: Beacon Press, 1989).
28. W.D. Nordhaus and J. Tobin, "Is Growth Obsolete?" in The Measurement of Economic and Social Performance, ed. M. Moss (Cambridge, MA: National Bureau of Economic Research, 1973).
29. C. Cobb, M. Glickman, and C. Cheslog, "The Genuine Progress Indicator 2001 Update" (San Francisco, CA: Redefining Progress, 2001).
30. E. Neumayer, "The ISEW: Not an Index of Sustainable Economic Welfare," Social Indicators Research 48 (1999): 77-101.
31. See S. Stymne and T. Jackson, "Intragenerational Equity and Sustainable Welfare," Ecological Economics 33 (2000): 219-36; P.A. Lawn, "A Theoretical Foundation to Support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and Other Related Indexes," Ecological Economics 44 (2003): 105-118.
32. S.M. Posner and R. Costanza, "A Summary of ISEW and GPI Studies at Multiple Scales and New Estimates for Baltimore City, Baltimore County, and the State of Maryland," Ecological Economics 70 (2011): 1972-80.
33. Easterlin, "Does Economic Growth Improve the Human Lot?" See also Easterlin, McVey, Switek, et al., "The Happiness-Income Paradox Revisited."
34. D. Kahneman, E. Diener, and N. Schwartz, eds., Well-Being: The Foundations of Hedonic Psychology (New York: Russell Sage Foundation, 1999); R. Inglehart, "Globalization and Postmodern Values," Washington Quarterly 23 (2000): 215-28; Easterlin, McVey, Switek, et al., "The Happiness-Income Paradox Revisited."
35. J.B. Schor, The Overspent American: Why We Want What We Don't Need (New York: Basic Books, 1998).
36. F. Hirsch, Social Limits to Growth (Cambridge, MA: Harvard University Press, 1976).
37. R.H. Frank, Luxury Fever: Why Money Fails to Satisfy in an Era of Excess (New York: Free Press, 1999).
38. T. Veblen, Theory of the Leisure Class: An Economic Study in the Evolution of Institutions (New York: Macmillan, 1899).
39. K.A. Brekke and R.B. Howarth, Status, Growth, and the Environment: Goods as Symbols in Applied Welfare Economics (Cheltenham, U.K.: Edward Elgar, 2002).
40. W.D. Nordhaus, Managing the Global Commons: The Economics of Climate Change (Cambridge, MA: MIT Press, 2004).
41. See Stern, The Economics of Climate Change; F. Ackerman, S.J. DeCanio, R.B. Howarth, and K. Sheeran, "Limitations of Integrated Assessment Models of Climate Change," Climatic Change 95 (2009): 297-315.
42. M. Wackernagel and W. Rees, Our Ecological Footprint: Reducing Human Impact on the Earth (Philadelphia, PA: New Society Publishers, 1996).
43. Stern, The Economics of Climate Change.
44. J.K. Galbraith, The Affluent Society (New York: Houghton Mifflin), 191.
45. A.K. Sen, Development as Freedom (New York: Anchor Books, 1999).
46. World Commission on Environment and Development, Our Common Future.