Review Essay

Toward a New Environmental Paradigm

Earth in the Balance: Ecology and the Human Spirit. By Albert Gore, Jr.*
Boston: Houghton Mifflin, 1992. Pp. 407. \$22.95.

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I. INTRODUCTION

Albert Gore, Jr. is a man with a mission. He wants to save the planet. Nothing short of a complete overhaul of the world economic system and a redefinition of our relationship to nature will satisfy him. Whether you agree with his plan for saving the planet or not, his recent book *Earth in the Balance* is a "must read." It is a *reveille* for environmental action in the same way as was Rachel Carson's *Silent Spring*,¹ except it calls for action on every front. As he noted in his acceptance speech for the Vice Presidential nomination, Mr. Gore believes that "[t]he task of saving the Earth's environment must and will become *the central organizing principle* of the post Cold-War world."² Coming from a politician who may have the power to act on his vision, this is heady stuff.

1. RACHEL L. CARSON, *SILENT SPRING* (1961).

2. Albert Gore, Jr., *America is Ready to Be Inspired and Lifted Again*, WASH. POST, July 17, 1992, at A28 (emphasis added); see also ALBERT GORE, JR., *EARTH IN THE BALANCE: ECOLOGY AND THE HUMAN SPIRIT* 269 (1992) [hereinafter cited by page number only] ("[W]e must make the rescue of the environment the central organizing principle for civilization.").

Readers expecting to find an unreadable book, written by a coterie of senate staffers and full of platitudes, are in for a surprise. *Earth in the Balance* is written by the author himself, beautifully argued, and truly thought-provoking. Mr. Gore's book is structured as a dual quest to restore the "natural balance of the earth's ecological system"³ and to restore the appropriate balance between man and nature. It proceeds from an exposition of the crisis in the first two sections of the book to recommendations for addressing it, at the book's end.

Earth in the Balance is mostly about the perception of large patterns. Seeing about him a global environmental holocaust, the author strives to help his readers see it too. The book is unified by a series of computer generated pictures of the earth, with each successive snapshot bringing the planet into sharper focus.⁴ In helping his readers to perceive the global crisis, the author is self-consciously eclectic in approach. He does not exaggerate when he claims to draw upon "perspectives offered by the earth sciences, economics, sociology, history, information theory, psychology, philosophy, and religion."⁵ To borrow the words of Ivan Illich, a philosopher whom Mr. Gore admires, the Vice President is "searching for a language to speak about the shadow our future throws."⁶

Mr. Gore's elegance and breadth of reference put the specialized reviewer at something of a disadvantage. As an economist, however, I feel particularly qualified to evaluate the last third of the book. For in this section, the Vice President avowedly speaks from the vantage point of a politician.⁷ And as a politician proposing solutions to problems in the real world, Vice President Gore necessarily speaks the language of economics. My focus on the prescriptive portion of the book is justified because—no matter how persuasive—the book must be adjudged a failure if its policies are misguided. A leader must not only identify problems and move the public to action, but also must ensure that the action adopted is timely and effective given existing constraints. In this last task, economics is indispensable.

The Vice President is not oblivious to economics, but he cannot bring himself to embrace its premises fully. My essential difference with the author is contained within the ambiguity of the book's title. The phrase "earth in the balance" may be, and is, used in the loose metaphorical sense that the planet is in grave danger.⁸ But it may also be used in the crude, strict metaphorical sense that the earth may be placed in a merchant's balance, and weighed

3. P. 270.

4. Pp. 17, 165, 267.

5. P. 269-70.

6. P. 47.

7. P. 270.

8. See, for example, the concluding words of the book: "We can believe in th[e] future and work to achieve it and preserve it, or we can whirl blindly on, behaving as if one day there will be no children to inherit our legacy. The choice is ours; the earth is in the balance." P. 368.

against competing considerations—balanced against the proverbial six bars of gold. Mr. Gore recognizes this meaning of the phrase too, but he attributes it to the Bush administration, and dismisses it as “absurd.”⁹ This Essay is written from the perspective of an economist who accepts both meanings of the phrase. It does not deny that the earth may lie “in the balance,” but neither does it shirk from the necessity of *placing* the earth “in the balance.”

After an attempt to give the reader a flavor of the book as a whole, this Review Essay undertakes a detailed critique of Vice President Gore’s plan for action, the Global Marshall Plan. It then notes what is most sorely lacking in the book, a realistic discussion of the political dynamics, and attempts to fill the gap. Finally, this Essay analyzes the concept of sustainable development that is the ostensible goal of environmental policy, and compares two roads to its attainment: the “visionary” approach taken by Mr. Gore, and the “policy analytic” approach preferred by economists.

II. THE ENVIRONMENTAL AND SPIRITUAL BREAKDOWN

In the first two-thirds of the book, Vice President Gore paints a grim picture of how we are destroying the planet. He goes through a litany of problems ranging from the loss of the Aral Sea¹⁰ to the disappearance of rainforests at the fantastic rate of 1.5 acres per second.¹¹ The Vice President describes the strategic environmental threats posed to our air, water, and land. At the heart of the book lies the contestable claim that a consensus is forming in the scientific community about the likelihood and severity of global warming. Mr. Gore bolsters this claim by pointing out that in the past climate changes have caused political instability and disrupted activities throughout the world.¹²

Mr. Gore claims that the twin evils of technology and population growth exacerbate the strategic environmental threats.¹³ Rapid population growth puts ever-increasing pressures on the world’s resource base and intensifies our vulnerability to potential changes in climate.¹⁴ While Mr. Gore does not ignore the potential mitigating impacts of technology, he claims to foresee projected climate changes sufficiently large to dwarf our ability to deal with them.¹⁵ In his view, we are conducting a massive unethical experiment on

9. P. 193.

10. Pp. 19-20.

11. P. 118.

12. Some time between 1150 and 1136 B.C., for example, the Hekla 3 volcano in Iceland erupted. Mr. Gore claims that this event may have caused unusually harsh weather in China and Scotland the following winter. Pp. 58-59.

13. P. 30.

14. P. 78.

15. For example, Mr. Gore notes that previous climate changes are in the range of 1 to 2 degrees Centigrade, but he believes we are moving toward changes that are 3 to 4 times that amount. P. 73

patient earth, where we are the guinea pigs.¹⁶ We can manipulate nature, “but our notions of how to consolidate and protect the environment against unintended consequences are still rudimentary.”¹⁷ The basic problem is that we now have “godlike powers,” but we have failed to exercise “godlike wisdom.”¹⁸

Vice President Gore believes that the global environmental crisis is an outward manifestation of a spiritual crisis.¹⁹ People, especially politicians, have avoided taking moral responsibility for their actions. We are no longer in balance with nature. This disharmony in our relationship to the earth has led to a no-deposit, no-return society. “Our insatiable drive to rummage deep beneath the surface of the earth . . . is a willful expansion of our dysfunctional civilization into vulnerable parts of the natural world.”²⁰ We must recognize that man is spiritually linked with the natural world rather than separate from it. The argument is reminiscent of Thoreau’s *Walden Pond*²¹ and Schumacher’s *Small is Beautiful*.²²

Mr. Gore’s solution lies in two simple ideas—first and foremost, in developing structures that limit environmental harm and lead to a resurgence in environmental productivity; second, in educating the wayward masses and misguided elites as to the folly of our ways. Rethinking man’s relationship to the environment will require a new kind of “eco-nomics” that counts the environment as an investment in the future rather than simply an additional cost of doing business. Ultimately, however, the prime mover for change must be a heightened awareness of the current imbalance between nature and man. This sensitivity can come only through concerted efforts in education. “Our challenge is to accelerate the needed change in thinking about our relationship to the environment in order to shift the pattern of our civilization to a new equilibrium—before the world’s ecological system loses its current one.”²³

But simply to state Mr. Gore’s argument does not do it justice. Like Rachel Carson, the author moves us more by rhetoric than by logical persuasion. The Vice President has the journalist’s appetite for anecdotes, yet the novelist’s gift for rendering them true. He will draw from any source to illustrate a point, from *Principia Mathematica*²⁴ to *Saturday Night Live*²⁵—all to great effect. The only constants in the book are the references to Gore’s personal experience (“In the course of one human lifetime—

16. P. 92.

17. P. 214.

18. P. 240.

19. P. 12.

20. P. 234.

21. Henry D. Thoreau, *Walden*, in *WALDEN AND OTHER WRITINGS OF HENRY DAVID THOREAU* 3 (Brooks Atkinson ed., 1965).

22. E. F. SCHUMACHER, *SMALL IS BEAUTIFUL: ECONOMICS AS IF PEOPLE MATTER* (1973).

23. P. 48.

24. P. 47.

25. P. 153.

mine . . . ”),²⁶ and to the folks back home in Tennessee.²⁷ This latter tendency stands in stark contrast to his reticence about his friends at Harvard, who go unmentioned with the exception of one oblique reference to a “college” professor.²⁸

One of the most memorable, and revealing, passages in the book tells the story of a valiant group of Soviet scientists during World War II:

[E]ven during the bombardment of Leningrad, Vavilov’s colleagues bravely planted new generations of crops in order to freshen their genetic stock. And when hungry rats learned to knock the metal boxes of seeds off the shelves to get to the contents, the scientists took turns standing watch to protect their genetic treasures.

Surrounded by edible seeds and sacks of plants such as rice and potatoes, fourteen of the scientists died of starvation in December rather than consume their precious specimens. Dr. Dmytry S. Ivanov, the institute’s rice specialist, was surrounded by bags of rice when he was found dead at his desk. He was reported to have said shortly before his death, “When all the world is in the flames of war, we will keep this collection for the future of all people.”²⁹

The story of the Vavilov institute is representative not only for its power and poignancy. Mr. Gore’s admiration for these martyrs also manifests, in extreme form, his preference for personal changes in behavior over technological fixes. At one point or another, Mr. Gore casts his scorn upon the science of genetic engineering,³⁰ and upon various schemes for desalinizing water,³¹ incinerating garbage,³² and fertilizing the oceans.³³

Furthermore, the Vavilov story exemplifies Mr. Gore’s fondness for military analogy. In Mr. Gore’s view the world’s areas of genetic diversity were “under a siege of their own” in the 1940’s—the only difference being that the environmental siege, rather than lifting by the war’s end, has tightened its grip in the decades since.³⁴ Elsewhere, Mr. Gore likens the world’s environmental insensitivity to its deafness on the night of *Kristallnacht*,³⁵ and, repeatedly, to Chamberlain’s appeasement of Hitler.³⁶ Such analogies underscore not only the moral dimensions of the danger perceived by the Vice

26. P. 31; on the link between Mr. Gore’s ideological and psychological growth, see pp. 14, 364.

27. Pp. 2, 4, 15, 16, 38, 153, 288.

28. P. 4.

29. Pp. 281-82.

30. P. 141.

31. P. 114.

32. P. 156.

33. P. 215.

34. P. 281.

35. P. 177; see also Mr. Gore’s comparison of environmental indifference to the “moral blindness implicit in racism and anti-Semitism,” p. 189.

36. Pp. 196, 274-75.

President, but also the magnitude of the threat, and its global nature. We should thus not be surprised to discover that it is strategic nuclear defense, the Vice President's first love, that provides the paradigm for his analysis of ecological issues.³⁷ Our energies, he insists, should be devoted to defusing "strategic" global conflicts, rather than local skirmishes or regional battles.³⁸

In advancing these arguments, and employing the rhetorical strategies illustrated by the Vavilov passage, the first two-thirds of *Earth in the Balance* makes a powerful case that the earth is indeed in the balance. Though the purpose of this Review Essay is not to quarrel with that conclusion, I cannot recount Mr. Gore's argument without two serious caveats.

First, the discussion of climate change, while lucid, is hardly balanced. Vice President Gore admits there are disagreements among reasonable scientists and economists, but tends to view science (and the world's welfare) through a very narrow lens. The Vice President has given a fair portrayal of the environmentalist position on climate change,³⁹ but fails to acknowledge that it is far from universally accepted.⁴⁰ For example, Mr. Gore showers compliments on Roger Revelle, his Harvard professor, as a man who sensitized him to the importance of climate change, yet he does not relate Revelle's recent opinions on the subject.⁴¹ In fact, Revelle's recent view is far more cautious than that of his star pupil: "The scientific base for a greenhouse warming is too uncertain to justify drastic action at this time. There is little risk in delaying policy responses to this century-old problem since there is every expectation that scientific understanding will be substantially improved within the next decade."⁴²

Second, Mr. Gore's discussion of global resource depletion is simplistic, for it neglects the essential underlying issue—the vitality of the price mechanism. Questions raised concerning the "sustainability" of the world's current growth path are reminiscent both of Malthusian arguments that the world was running out of food,⁴³ and the more recent panic over energy articulated in the "limits to growth" literature.⁴⁴ Malthus and Meadows have thus far been proved wrong, because the price mechanism works adequately

37. Pp. 7-8.

38. Pp. 28-29.

39. See e.g., MICHAEL OPPENHEIMER & ROBERT H. BOYLE, *DEAD HEAT: THE RACE AGAINST THE GREENHOUSE EFFECT* (1990); STEPHEN H. SCHNEIDER, *GLOBAL WARMING* (1989); Jessica Matthews, *Science, Uncertainty and Common Sense*, WASH. POST, Nov. 3, 1991, at C7.

40. Richard S. Lindzen, *Global Warming: The Origin and Nature of the Alleged Scientific Consensus*, REGULATION, Spring 1992, at 87, 95.

41. Pp. 4-6.

42. Fred S. Singer, et al., *What to Do About Greenhouse Warming: Look Before You Leap*, COSMOS, vol. 1, no. 1, at 28 (1991).

43. THOMAS R. MALTHUS, *AN ESSAY ON POPULATION* 5-11 (J.M. Dent & Sons 1914) (1798).

44. See, e.g., DONELLA H. MEADOWS ET AL., *THE LIMITS TO GROWTH: A REPORT FOR THE CLUB OF ROME'S PROJECT ON THE PRECIPITATION OF MANKIND* (1972). For an insightful and amusing account of how the prophets of doom hedge their bets, see Gregg Easterbrook, *Propheteers: Environmental Problems are Alarming Enough Without the Domsayers' Exaggerations*, WASH. MONTHLY, Nov. 1991, at 43-46.

in communicating information on scarcity.⁴⁵ One of course may argue that markets do not work so well when particular goods and services are not priced directly in the marketplace. Indeed, this is a frequently used and abused rationale for government regulation of the environment.⁴⁶ My point is simply that the vitality of the price mechanism in this context is a question that requires further research. Malthusian despair may be once again premature.

This is not to say, however, that Vice President Gore's entreaties should be ignored. Even if the horrors of global warming and resource depletion are overdrawn, there remains ample reason for alarm. The threat to biodiversity alone may be cause for action.⁴⁷ Vice President Gore has made a persuasive argument that the future of the earth lies in the balance. The question is what is to be done.

III. THE POLICY PRESCRIPTIONS: A REVIEW AND CRITIQUE

The policy recommendations for this book are neatly laid out in the penultimate chapter of the book, entitled "A Global Marshall Plan." There are five key aspects of the plan: (1) to stabilize population; (2) to develop and apply "environmentally appropriate technologies"; (3) to introduce a "new global eco-nomics"; (4) to develop new international treaties to deal with the myriad environmental problems that are global in scope; and (5) to educate the world's population about global environmental issues.⁴⁸

A. *The First Pillar of the Marshall Plan: Population Stabilization*

One can certainly imagine a situation in which too many people inhabit the earth and impose sufficient strain on the earth's resources that civilization as we know it comes to a screeching halt. Vice President Gore traces the exponential rise in population over the last few thousand years, noting that up until the time of Caesar there were fewer than one quarter of a billion people on the planet.⁴⁹ By 1945 there were about two billion people. Today there are 5.5 billion and by about 2030, the population is expected to be around nine billion.⁵⁰ He believes that we must stop the growth in population as a way of arresting the earth's environmental decline.

An economic argument frequently offered to support Mr. Gore's position asserts that, at some point, adding additional people to the earth is likely to

45. See, e.g., JULIAN L. SIMON, *THE ULTIMATE RESOURCE* 17-22, 90-110 (1981).

46. See e.g., Charles Wolf Jr., *A Theory of Nonmarket Failure: Framework for Implementation Analysis*, 22 J.L. ECON. 107 (1979).

47. See generally EDWARD O. WILSON, *THE DIVERSITY OF LIFE* (1992).

48. Pp. 305-06.

49. Pp. 30-31.

50. P. 31.

result in a net drain on accumulated wealth.⁵¹ More specifically, if the focus is on environmental and natural resource wealth, the notion is that at some point an additional person will contribute to a net decrease in these resources, thus possibly limiting opportunities for future generations. It may make sense to think about an appropriate "scale" for human activity, which would include a measure for the appropriate size of the population.⁵² This measure would depend on a number of things, including technology and social, political, and economic institutions.⁵³

Suppose we take Mr. Gore's thesis at face value for the moment—that population increase will lead to environmental degradation if something is not done. If the planet cannot "sustain" this increase at current levels of consumption, how should the problem be addressed? One approach would regulate population directly, either through a pricing mechanism or a quantity mechanism. A second approach would regulate the "externalities" associated with population growth, such as increased pollution, congestion, and garbage. The two approaches are not mutually exclusive. Moreover, they both may be required to achieve a kind of economic optimality.⁵⁴

Vice President Gore believes that population control policies are needed. He prefers a multifaceted approach that would target illiteracy in developing countries, educate populations on birth control, supply birth control devices to people who want them, and reduce infant mortality.⁵⁵ The motivation for a program to reduce infant mortality is that it will give parents greater assurance that their children will grow up, and thus decrease the motivation for having large families.⁵⁶

As with virtually all of his proposals, Vice President Gore makes no attempt to ascertain whether the plan he endorses represents the best way of achieving his objective. If one were solely interested in slowing the rate of growth in population, there are a variety of programs that can achieve that goal, including a tax on childbearing or more draconian measures, such as a

51. See MALTHUS, *supra* note 43. I purposely leave the definition of wealth vague here. In this context, wealth could be defined narrowly to include material wealth or more broadly to include other components that might affect the quality of life.

52. Herman Daly argues that just as economists think about the optimal scale for a particular industry, they should also think about the optimal scale for all economic activity in relationship to the planet. See Herman E. Daly, *Sustainable Development: From Concept and Theory to Operational Principles*, in *RESOURCES, ENVIRONMENT, AND POPULATION: PRESENT KNOWLEDGE, FUTURE OPTIONS* 25, 28-29 (Kingsley Davis & Mikhail S. Bernstram, eds., 1991) [hereinafter *RESOURCES, ENVIRONMENT, AND POPULATION*].

53. This measure might differ across societies at a given point in time. For example, in wealthier or less densely populated societies, increases in population might increase the stock of environmental wealth, whereas in poorer societies, increases might lead to greater stress on the resource base.

54. Ronald Lee suggests both sets of policies would be needed to achieve economic optimality in theory; however, he notes that there may be severe technical and political problems in designing and implementing a tax. Ronald D. Lee, *Comment: The Second Tragedy of the Commons*, in *RESOURCES, ENVIRONMENT, AND POPULATION*, *supra* note 52, at 315.

55. P. 312.

56. P. 311.

limit on the number of children in conjunction with forced sterilization. One might also consider the introduction of a market in the right to bear children by distributing rights to have children to members of the population and allowing these rights to be traded.⁵⁷ There are obvious strengths and weaknesses to these different proposals.

It is premature, in my view, to suggest that population controls are a needed or even a desirable mechanism for reducing the rate of global environmental change. If, for example, the objective is to limit net carbon dioxide emissions in the atmosphere, the most efficient way to accomplish this is through a tax or marketable permit scheme that puts a price on these emissions and provides an equivalent subsidy for activities that increase the storage of carbon dioxide in "sinks," such as trees. Controlling population is an ineffective and inefficient way of addressing most environmental issues involving definable physical or economic objectives.

The linkage between population and various aspects determining the quality of life is complex. It is simplistic to suggest that an increase in population will necessarily result in a decline in environmental quality or an increase in the use of certain resources. Problems need to be clearly specified and key feedbacks need to be identified. For example, as societies become more wealthy (in a material sense), there appears to be a reduction in family size and an improvement in local environmental quality. This may suggest that an alternative strategy for dealing with global environmental issues is to focus on introducing market institutions that generate wealth and also take account of global environmental issues.

There is evidence that in poor countries population growth has an adverse impact on resource degradation. Large families are needed to carry out tasks necessary for subsistence, such as gathering fuelwood, cooking food and obtaining water.⁵⁸ There is a cycle of poverty that is exacerbated by the interplay between resource degradation, population growth, and the need to survive. On the other hand, economic growth can improve local environmental quality. Mikhail Bernstram argues that "as economies grow, discharges to the environment increase rapidly, then decelerate, and eventually decline."⁵⁹

57. KENNETH E. BOULDING, *THE MEANING OF THE TWENTIETH CENTURY*, 135-136 (1964).

58. Partha Dasgupta & Karl-Goran Mäler, *The Environment and Emerging Development Issues* 23 (1990) (unpublished manuscript, on file with the author).

59. Mikhail S. Bernstram, *The Wealth of Nations and the Environment*, in *RESOURCES, ENVIRONMENT, AND POPULATION*, *supra* note 52, at 333. Bernstram does not examine carbon dioxide emissions, but does review data on per capita energy consumption. Bernstram also provides some interesting data comparing energy use and pollution in market and socialist economies. *Id.* at 363-369. The data support the view that socialist economies use more energy per person for a given level of output per person and they also suggest that energy per capita increases and then eventually declines as GNP per capita grows in market economies. Such aggregate analysis masks the importance of particular policies towards energy pricing and pollution control in individual countries. Nonetheless, it strongly suggests that increased energy use is *not* a prerequisite for conventionally defined economic growth.

There may be an economic case for regulating population in the interest of preserving or enhancing local or global environmental assets. Vice President Gore does not make that case, however. The first step in making the case for global issues, such as climate change, is to show why it is more efficient to focus on an indirect variable affecting the problem rather than its immediate cause.

There may be other reasons for ensuring access to birth control devices. As a matter of principle, some would argue (myself included) that women and men, particularly in developing countries, should have greater access to birth control technologies that would give them a richer choice over whether or not to have children. Limiting population in some developing countries might also promote political stability. In some instances, it could help slow the rate at which valuable wilderness areas are developed or defiled.⁶⁰

The potential linkage between population and environmental degradation deserves further study. It is often asserted that human beings tend to use environmental resources at a rate that is faster than some "optimal" path.⁶¹ This assertion is based on the view that the environment is a type of commons.⁶² The problem with this argument is that the environment is multi-dimensional. Some parts of our environmental wealth may be depleted too rapidly, while others may not be depleted rapidly enough.⁶³ There is a strong case to be made that global problems are not receiving adequate attention, and Mr. Gore makes it. His discussion provides a useful basis for a research

60. Population growth could also affect the politics between nations. At present, roughly 85% of all the world's children live in third world countries. Kingsley Davis, *Population and Resources: Fact and Interpretation*, in *RESOURCES, ENVIRONMENT, AND POPULATION*, *supra* note 52, at 1, 9. In a world that is becoming more interconnected all the time, this percentage is staggering. As this group ages, there may be extreme pressures on developed countries to increase assistance and liberalize immigration policies.

61. See Lee, *Comment: The Second Tragedy of the Commons*, in *RESOURCES, ENVIRONMENT, AND POPULATION*, *supra* note 52, at 320, arguing that we select an environmental standard that is lower for the future than we might like if we could register our true preferences in terms of trading off population and environmental quality. Lee also makes an important argument about the need to tax reproduction in order to have optimal use of environmental and natural resources. In a population that is changing, it is not sufficient simply to charge a price for the resource or limit access through the use of transferable property rights. The problem is that the optimal level of usage of these resources is linked to the number of people who might use the resource. Thus, for example, with more people, the optimal level greenhouse gases could be higher, since the cost of reducing these gases would likely be higher (for a given level of technology). The solution for optimal resource usage is not only to adopt an appropriate allocation mechanism for the resource itself, but also to charge for births an amount that reflects the costs imposed on the society at large. *Id.* at 318. This argument, while theoretically elegant, may be difficult to apply because of difficulties in computing an appropriate birth tax. Moreover, the argument does not consider the linkage between technology and population, which could be positive or negative. The challenge for research is to identify and measure those externalities related to population that are likely to be important.

62. See Garrett Hardin, *The Tragedy of the Commons*, 162 *SCIENCE* 1243 (1968).

63. Moreover, the politics of environmental decisionmaking is often overlooked. Politics may drive countries or regions to make environmental decisions that result in excessive regulation relative to an economist's notion of optimality. I believe this happened in the initial round of the Montreal Protocol (though subsequent evidence justified a more stringent standard), and in recent acid rain legislation in the United States. I hasten to add that there is a great deal of uncertainty in even estimating the narrow concept of net economic benefits. See, e.g., Robert W. Hahn & John Hird, *The Costs and Benefits of Regulation: Review and Synthesis*, 8 *YALE J. REG.*, 233, 241-243 (1991).

agenda. Such an agenda is likely to show, however, that the linkages between specific environmental problems and policies controlling population are subtle, and in many instances, counterintuitive.⁶⁴ Vice President Gore's solutions are not convincing, because they fail to account for this complexity.

B. The Second Pillar of the Marshall Plan: Appropriate Technologies

Vice President Gore tries to make a strong case for an environmental and economic policy aimed at the rapid development and diffusion of appropriate technologies. He believes that a "Strategic Environmental Initiative" should be launched to deal with global environmental issues,⁶⁵ which would be patterned after the Strategic Defense Initiative and have similar levels of funding. The Strategic Environmental Initiative would have several components, including: tax incentives and funds for research and development that would encourage new technology and discourage old technology; government purchasing programs to stimulate the introduction of new technologies; a guarantee of large profits for new technology; sophisticated technological assessment procedures for determining the economic and ecological impacts of proposed technologies; training centers for educating an elite group of environmental planners and technicians; export controls on environmentally unfriendly technology; and improvements in laws protecting inventions and ideas.⁶⁶

This is an incredible laundry list. It could easily result in central planners selecting environmentally and politically correct products and technologies. It is nothing less than environmental socialism. Imagine bureaucrats trained at our best universities deciding what technologies are environmentally appropriate. These products and technologies would not necessarily have to pass a market test, because Vice President Gore believes that a market with guaranteed profits should be created for them. How sweet it would be if your product were the lucky winner. Environmental bureaucracies around the world would be in seventh heaven. Whether the environment would improve is another matter, since the bureaucratic renaissance could have a numbing impact on the world economy, which in turn would dampen enthusiasm for making the kinds of "investments" Vice President Gore wants for an environmental star wars offensive.

64. The impact of population on resource use will vary as a function of income of the individual, region, and consumption patterns. For example, one fewer human being in a developed country may result in a greater reduction in greenhouse gas emissions than one fewer human being in an undeveloped country. At the same time, one fewer human being in an undeveloped country may have a greater salutary impact on local environmental quality than one fewer human being in the developed country.

65. P. 319.

66. P. 320.

Vice President Gore goes further. He provides a list of recommended technologies and regulations—many of which are right out of the environmental do-gooders' songbook. These include the promotion of cost-effective photovoltaic cells⁶⁷ (who could be against cheap solar power—ignoring the environmental impact of the materials used in the production of these cells?); the promotion of wind-generated energy;⁶⁸ the introduction of building codes that require more energy-efficient materials;⁶⁹ the required use of energy-efficient light bulbs;⁷⁰ the introduction of information superhighways;⁷¹ the further subsidization of mass transit and the promotion of telecommuting;⁷² and the advancement of recycling and waste reduction technology.⁷³

Any or all of these ideas may have merit for achieving a particular social objective, and some of them may even be economical. But the reader is rarely told about either the costs and benefits of these technologies,⁷⁴ or the particular reason for choosing a specific policy. Evidently, the Vice President has been through enough hearings that he feels confident picking the winners and losers and creating the necessary markets to prime the proverbial environmental pump.⁷⁵ The problem with this kind of policy prescription is that it is devoid of analysis—thus requiring the reader to have a great deal of faith in the judgment of the politician endorsing these ideas.

I, for one, am not persuaded. This is an industrial policy without a well-defined mission. Even if one were willing to buy into the Vice President's premise that the environmental apocalypse has arrived, there are likely to be better ways to respond. A carbon tax may be a less onerous method of reducing carbon than assembling a panel of distinguished experts to pick the most promising technologies. Similarly, a gasoline tax may be more effective at reducing gasoline consumption than a hike in the fuel economy standards. The thrust of my argument, developed at greater length in Part V, is that the government should, where possible, set the broad ground rules for environmental protection rather than micromanage individual decisions in the private sector. Vice President Gore sometimes seems to recognize this

67. P. 327.

68. P. 330.

69. P. 333.

70. P. 332.

71. P. 327.

72. P. 326

73. Pp. 333-34.

74. But see p. 332 for a brief discussion of the trade-off between capital costs and operating costs in purchasing more energy-efficient light bulbs. My point is not that such purchases might not be economical; in some cases, they very well may be, and some kinds of light bulbs may be good examples. The problem is that there are costs to regulatory programs that require or encourage such technologies, and the costs of these programs need to be weighed carefully against the benefits. Blanket mandates are not likely to be effective or efficient. In many cases, the proposed cure may be worse than the disease. See, e.g., BRUCE A. ACKERMAN & WILLIAM T. HASSLER, *CLEAN COAL/DIRTY AIR* (1981).

75. See, e.g., pp. 320-32 (singling out a number of emerging technologies for praise).

argument, but his foray into the appropriate technology game⁷⁶ suggests that he supports a huge expansion in government bureaucracy and regulation.

Once the appropriate technology is developed, there is the equally important matter of diffusion. There are folks in the real world as well as in bureaucracies, such as the State Department, who believe that technology should be given away for free. Needless to say, the requirements one places on the providers of technology could have a dramatic impact on their willingness to invest in the development of new technology. Vice President Gore seems to understand the problem of incentives and technology transfer. To solve the problem, he proposes creating a new stream of revenues by using green taxes—a clever application of the new discipline of eco-nomics.

C. *The Third Pillar of the Marshall Plan: The Eco-advocate's View of Eco-nomics*

Vice President Gore believes that economic decisions “are bringing us steadily closer to the brink of ecological catastrophe.”⁷⁷ He correctly identifies two root causes of the problem: national income statistics that do not adequately reflect environmental changes and misguided government policies that encourage the over-exploitation of natural and environmental resources.

1. *Accounting Frameworks for a Sustainable World*

Economists generally agree that national income statistics, such as Gross National Product (GNP), do not adequately account for environmental benefits.⁷⁸ They differ, however, on how best to remedy this defect. Moreover, it is unclear whether the inclusion of environmental resource costs and benefits will have a large or small impact on output measures. Vice President Gore obviously believes the effect will be large because “for all practical purposes, GNP treats the rapid and reckless destruction of the environment as a good thing.”⁷⁹ He believes that “to accomplish the transition

76. As Vice President Elect, Mr. Gore had already shown a propensity to get involved in the appropriate technology debate. Recently he decided to try to block the siting of a hazardous waste incinerator in Ohio. This plant would have provided jobs in an economically depressed area while applying state-of-the-art technology for reducing hazardous wastes. Despite the fact that known health risks were de minimus, Mr. Gore believed that blocking the siting of this facility was desirable. While such stands may ingratiate the Vice President with environmental groups such as Greenpeace, they make one question his commitment to preserving environmental quality while promoting jobs and economic growth. See, e.g., *Environmental Preview?*, WALL ST. J., Dec. 30, 1992, at 6; *Gore on a Von Roll*, WALL ST. J., Jan. 8, 1993, at A14.

77. P. 85.

78. See, e.g., ROBERT REPETTO ET AL., *WASTING ASSETS: NATURAL RESOURCES IN THE NATIONAL INCOME ACCOUNTS* (1989); Shantayanan Devarajan & Robert J. Weiner, *Natural Resource Depletion and National Income Accounting* (May 1992) (unpublished manuscript, on file with the author).

79. P. 185. Vice President Gore quotes Herman Daly, one of the more thoughtful critics of our current resource policy, as saying that “[t]here is something fundamentally wrong in treating the earth as if it were

to a new economics of sustainability, we must begin to quantify the effects of our decisions on the future generations who will live with them."⁸⁰

Including estimates of environmental degradation and resource use in national income accounts is not a straightforward exercise, even in theory. Economists begin by defining a measure of welfare, Net National Product (NNP), which represents the sum of the value of all goods and services the economy produces, net of depreciation. When measured at appropriate (optimal) prices, this measure can be shown to correspond to a measure of welfare that maximizes the present value of consumption over time.⁸¹ Karl-Göran Mäler applies these ideas to the case of environmental resources.⁸² He argues that NNP needs to be adjusted by deducting environmental damages and adding the value of net changes in the environmental resource base as well as other resources.⁸³ At the same time, he suggests that defensive expenditures to avoid pollution, such as the cost of doing laundry more frequently, should be included. Interestingly, Mäler also finds that wages paid in producing goods should *not* be included as part of the net national product since, at the margin, workers are indifferent as between receiving an extra hour's wages or taking that time off, in which case they would not be contributing to the NNP.⁸⁴

The formulation suggested by Mäler is sensible from a theoretical perspective, but quite complicated. It would require fundamental changes in the statistics currently used to describe economic activity. Most decisionmakers look at GNP as a measure of economic performance.⁸⁵ The measure suggested by Mäler corresponds to a highly stylized version of NNP. Thus, assuming the concept could be implemented, decisionmakers would need to be reeducated on the relevance of the measure.⁸⁶

The implementation of an elegant version of NNP that includes environmental and resource degradation creates profound measurement problems. Mäler's framework would require that NNP be calculated at optimal prices, that the marginal value of environmental resources in consumption and production be estimated, and that the optimal levels of consumption of all resources be estimated. The algorithm for implementing this idea would involve three basic steps. First, "correct" prices and marginal valuations in a

a business in liquidation." P. 191.

80. P. 339.

81. See Martin Weitzman, *On the Welfare Significance of National Product in a Dynamic Economy*, 90 Q.J. ECON. 156 (1976) (showing perpetual stream of income equal to net national product equals present value of stream maximizing consumption).

82. Karl-Göran Mäler, *National Accounts and Environmental Resources*, 1 ENVTL. & RESOURCE ECON. 1 (1991).

83. *Id.*

84. *Id.* at 6.

85. Devarajan & Weiner, *supra* note 78, at 4.

86. According to Mäler, implementation is no small feat. For a formal statement of the rules for constructing a theoretically sound measure, see Mäler, *supra* note 82, at 6-7. In the case of uncertainty (i.e., the real world), the analyst must also distinguish anticipated from unanticipated changes in prices, resource levels, and technologies, *id.* at 13, a daunting task that is beyond most mortals I know.

world with no market failures would need to be defined. Second, net national product would be calculated along an optimal path. Third, net national product would be recalculated along the path currently traveled at the optimal prices. This is a bit much to swallow, even for an economist.

Two fundamental problems arise from this approach. First, the equilibrium associated with optimal prices may not be attainable. That is, there may not be political institutions in the real world that allow such an equilibrium to be attained. Even if such an equilibrium were attainable, a second problem is that a move to that equilibrium may not be desirable. For example, the amount of lobbying activity might differ under the new and old equilibria.⁸⁷ These costs are routinely ignored in economic analyses of income accounts, but they are quite important. Suppose it was found that environmental policies led to a 5% shortfall in output or welfare relative to some "optimal" policy. Would it then be desirable to pursue the optimal policy, even in the narrow sense of increasing output or welfare? The answer depends on the costs of transition and the costs of maintaining the new equilibrium.

This concern is more than a quibble, particularly in the case of developing economies where the issue of including environmental impacts in national income accounting has been most extensively studied.⁸⁸ What should the political baseline be? Should it be a stable political structure, which yields a stable investment climate along with competitive markets? If so, are we not assuming away some of the most fundamental problems faced by developing countries?⁸⁹ There are no simple answers to these questions. They involve fundamental choices about the theoretical baseline from which to measure changes in output or welfare.

In making comparisons, we should restrict our attention to the range of feasible alternatives, rather than comparing the status quo with Nirvana. Many theoretical economists argue that a price vector be used that corresponds to the case of perfectly competitive markets. An alternative would be to identify

87. Consider the case of industry structure changes, such as the deregulation of airlines. There is no reason to expect the same amount of lobbying before and after regulation. It is sometimes asserted that the amount of lobbying or "rent-seeking" activity will decrease as markets become more competitive. This is an empirical question. See Robert W. Hahn & John A. Hird, *Letter to the Editor: Computing the Costs of Regulation*, REGULATION, Fall 1991, at 6. In contrast, transition costs in moving from one equilibrium to another are positive and quite real, as is clear from observing the wrenching transition the citizenry in Eastern Europe and the former Soviet Union are now encountering.

88. See, e.g., REPETTO, *supra* note 78; Devarajan & Weiner, *supra* note 78.

89. For an insightful analysis of the instability issue, see Jose Edgardo Campos, *The Political Economy of the Rent-Seeking Society Revisited: Cronyism, Political Instability and Development* (Sept. 1991) (unpublished manuscript, on file with the author) (arguing that instability may exist in dynamic equilibrium, so that rent-seeking societies may be inherently unstable).

Instability may mean that entrepreneurs use a higher discount rate, thus squeezing out investment that would have occurred in a more stable environment. Moreover, they may choose to use wasteful production technologies in order to get the most out of their resource in the limited time frame. In such cases, the best environmental and resource policy would provide a different institutional structure for defining and trading property rights. How one moves to that institutional structure in the real world is a critical issue about which little is known.

those aspects of the economy subject to the policymaker's control and compare the actual policy with the optimum that could be achieved subject to the constraints imposed on the policymaker.⁹⁰

The preceding critique highlights how little we, as economists, know about proper accounting when we move away from the theoretical ideal of perfectly competitive markets to the realities introduced in a real world in which politics is central. The problems are exacerbated by resources that are not priced adequately in markets, which is the typical case for environmental resources, and is sometimes the case for other natural resources, such as energy.

There have been two basic approaches for implementing environmental accounting. One, used by Robert Repetto, is to adjust gross domestic product for depreciation of natural resources.⁹¹ This adjusted measure reduces gross domestic product by about 6% in Costa Rica,⁹² 9% in Indonesia,⁹³ and 4% in the Philippines.⁹⁴ The clear implication is that these countries are consuming their natural resource base at an alarming rate and are not on sustainable growth paths.

Shantayanan Devarajan and Robert Weiner note two problems with this kind of analysis. First, GNP and GDP measures do not include depreciation, so it is arbitrary to include depreciation of one set of resources, but not others, such as machinery.⁹⁵ Second, the depreciation measure, which is equal to the difference between the price of the resource and its production cost, is only valid when the resource is being used optimally, but this is frequently not the case for environmental and natural resources. These authors suggest an alternative approach, which adjusts GNP for over- or under-exploitation of a resource.⁹⁶ Applying this framework to Mali and Thailand, they find that traditional measures overstate gross domestic product between 0.3% and 2%, which is significant, but not necessarily alarming.⁹⁷

90. It would be useful to explore the difference between first-best estimates of welfare or output, constrained estimates that reflect political considerations, and where we are now. The estimates are likely to be highly dependent on the welfare or output measure used. For example, one could estimate how output or economic efficiency would change with or without OPEC influencing the price of oil.

91. Gross national product for a country "is defined as the market value of all goods and services produced during a particular year" by residents of that country, whether produced outside the country or inside the country. Gross domestic product for a country is the "value of output produced by people, government, and firms in that country," including citizens of that country and foreign citizens. See ECONOMIC REPORT OF THE PRESIDENT 246 (1992).

92. RAUL SOLORZANO ET AL., WORLD RESOURCES INST., ACCOUNTS OVERDUE: NATURAL RESOURCE DEPRECIATION IN COSTA RICA 7 (1991) (taking average of ratio of natural resource depreciation to gross domestic product from 1970 to 1989).

93. REPETTO, *supra* note 78, at 6.

94. WILFRIDO CRUZ & ROBERT REPETTO, WORLD RESOURCES INST., THE ENVIRONMENTAL EFFECTS OF STABILIZATION AND STRUCTURAL ADJUSTMENT PROGRAMS: THE PHILIPPINES CASE 18 (1992) (averaging ratio of resource depreciation to gross domestic product from 1970 to 1987).

95. Devarajan & Weiner, *supra* note 78, at 4.

96. *Id.* at 7-9. This measure, when defined in terms of GNP, is not related to welfare; however, an analogous measure defined for NNP would be related to welfare in the desired ways. Interview with Shantayanan Devarajan, World Bank, in Washington, D.C. (Sept. 1, 1992).

97. Devarajan & Weiner, *supra* note 78, at 17.

This cursory review of the issues involved in accounting for changes in the environment suggests that it is much more easily said than done. While there is some convergence among economic theorists about how to measure things, these techniques tend to work in a world in which human beings do not exist. Actual applications of these theories, estimating the adverse impacts of particular resource policies in specific countries, have serious deficiencies when measured against the theoretical constructs. Moreover, to my knowledge, no serious empirical work has been done regarding some of the critical challenges posed by the fact that it will be costly to change resource management policies in the ways Vice President Gore might desire.

Just because we are low on the learning curve does not mean that we should not explore this issue, however. Vice President Gore is correct in calling for rethinking. Research funds should be provided to explore how national income accounts could be constructed and implemented. In some cases, I suspect, we will find that environmental and natural resources are being exploited in ways that mortgage the future, particularly in developing countries and highly centralized economies. In the developed countries, we may find the opposite; that is, some of our environmental resources may be underutilized, in a narrow economic sense. In sum, the claim that conventional national income accounting overstates the health of an economy, because it fails to account for environmental impacts adequately, is not warranted at this time.

Any measures of income and wealth are likely to be imperfect. The analysis by Mäler suggests that different measures may need to be tailored for different purposes.⁹⁸ For example, traditional GNP may be useful as a measure of how people think they are doing, but more refined measures, which include the costs of using resources and environmental services, may be more useful for describing the actual state of the economy. I use "may" because proposed conceptual improvements will not necessarily result in actual improvements, given the enormous measurement problems. This will depend on how the ideas are implemented. Moreover, a trade-off between analytic rigor and ease of estimation is common.⁹⁹

Given the difficulty in constructing conceptually attractive and easily implemented measures of output and welfare, one should consider whether introducing a new set of national income statistics is likely to be worthwhile. The primary value to be derived from changes in national income statistics should be their impact on private and public decisionmaking. I conjecture that a change in standard accounting procedures could have an impact on international lending institutions, but is unlikely to have a significant impact

98. Mäler, *supra* note 82.

99. A great deal of research is needed on the empirical relationship between different measures of output and welfare to determine where there are important differences in overall levels as well as the rate of change of these measures.

on politicians in the short term. Only if this new information serves to mobilize interest groups in a way that affects voters or the existing power structure will such measures have a pronounced impact. Politicians have little reason to change their behavior in response to new ways of looking at the world unless they are pressured.¹⁰⁰

2. *Policy Measures for a Sustainable World*

The second thrust of Vice President Gore's economic strategy is to introduce a variety of measures that induce people and businesses to take better account of the impact of their decisions on the environment. The recommendations include: eliminating subsidies for environmentally destructive activities,¹⁰¹ introducing economic incentive-based instruments for environmental protection,¹⁰² extracting additional information from companies on their pollution,¹⁰³ helping companies evaluate the costs and benefits of environmental efficiency, developing government standards for green labels,¹⁰⁴ introducing environmental standards in trade negotiations,¹⁰⁵ incorporating environmental concerns in international lending activities,¹⁰⁶ and extending the antitrust laws.¹⁰⁷

The elimination of subsidies that encourage over-exploitation of resources is a good idea. For example, why should the general public be asked to pay for roads that directly benefit only logging companies?¹⁰⁸ The logging companies should pay. Introducing economic incentive-based approaches is also a good idea; examples include debt-for-nature swaps and the use of marketable permits to reduce acid deposition. When using economic incentives, it is important to select problems that merit attention.¹⁰⁹ For example, Vice President Gore argues that nations should adopt a marketable emission credit approach for limiting carbon dioxide emissions.¹¹⁰ The desirability of such an approach depends in part on the damages one believes are likely to be

100. I suspect we will eventually run the experiment in some form, so we will be able to see how politicians respond.

101. P. 346.

102. Pp. 345-46.

103. P. 346.

104. P. 341.

105. Pp. 346-47.

106. P. 346.

107. P. 342-43.

108. P. 194.

109. Market-based approaches have increased in popularity for a number of reasons. See, e.g., Robert W. Hahn & Robert N. Stavins, *Incentive-Based Environmental Regulation: A New Era from an Old Idea?*, 18 *ECOLOGY L.Q.* 1 (1991). Some advocates of these ideas tend to ignore the importance of choosing problems for which the benefits of controlling pollution exceed the costs. See, e.g., Robert W. Hahn, *A Recipe for Sustained Environmental Growth*, *REGULATION*, Spring 1991, at 17.

110. Pp. 317-37.

associated with this greenhouse gas, a point on which there is a great deal of disagreement.¹¹¹

Providing additional information on pollution activities sounds good in theory. But the benefits of providing new information on emissions should be weighed against the cost of imposing additional paperwork requirements on businesses, which can be substantial.¹¹² In addition, the quality of the information provided may be subject to question. The United States has imposed substantial requirements on individual firms to report their emissions.¹¹³ There is anecdotal evidence suggesting that some firms have responded to this information by reviewing their activities and cutting their emissions.¹¹⁴

Additional information may also tilt the balance toward some groups in the environmental community who desire to play a greater role in the day-to-day operations of businesses. There is a move afoot to place environmentalists on the boards of major corporations.¹¹⁵ If environmentalists are successful in intervening in day-to-day operations of businesses, this is likely to have a deleterious impact on economic activity.¹¹⁶

The government should also actively promote environmental efficiency, according to Vice President Gore. He would like to see the government help private companies assess the costs and benefits of environmental efficiency. Such efforts would presumably build on recent efforts by the Environmental Protection Agency to promote energy efficiency and voluntary reductions of toxic pollution. The basic problem with this approach is that it ignores the fact that the private sector is likely to be able to do private cost/benefit calculations far better than government bureaucrats, who are rarely asked to pass a market test to ensure their survival. Instead, government bureaucracies should provide

111. It also depends on the ease of implementing such a system. Dudek, Hahn, and Stavins argue that there are formidable obstacles in implementing an international system of marketable permits. Daniel J. Dudek et al., *International Trading in Greenhouse Permits* (Mar. 1992) (unpublished manuscript, on file with author). On the other hand, Dudek and LeBlanc suggest that the United States is a logical place to experiment with a market-based approach for limiting carbon dioxide emissions. Daniel J. Dudek & Alice LeBlanc, *Offsetting New CO₂ Emissions: A Rational First Greenhouse Policy Step*, CONTEMP. POL. ISSUES, July 1990, at 29.

112. It is interesting to note that neither Vice President Gore nor the environmentalist community has asked for information on the polluting activities of individuals. I conjecture that they have avoided this because they realize such reporting could be expensive and could result in a political backlash. The environmental community would rather perpetuate the myth that industry and government, and not the public, are responsible for pollution. Politicians embrace this view as well. See generally Robert W. Hahn, U.S. Environmental Policy: Past, Present, and Future (Dec. 1991) (unpublished manuscript, on file with author).

113. *Id.*

114. The 3M company instituted a Pollution Prevention Pays program as a result of increased sensitivity to its pollution. P. 342.

115. *Valdez Principles: Aiming for Fortune 500's*, Greenwire, Aug. 19, 1991, available in LEXIS, Nexis Library, Greenwire file.

116. Most businesses need to respond quickly to changes in the increasingly competitive global marketplace. To the extent that environmentalist intervention reduces the ability of business to respond, it is likely to have an adverse impact on business performance.

easy access to information on emerging technologies, which may be costly for private firms to obtain. Even here, however, such information may be provided more effectively by private firms.¹¹⁷

The notion of having the government set standards for green labels is appealing. After all, consumers would like to have confidence that the products they are purchasing are environmentally friendly. Unfortunately, this standard is often very difficult to set, as the debate between disposable and cloth diapers demonstrates.¹¹⁸ The government would be well-advised to stay out of the business of making such difficult decisions. If it feels the need to provide standards, it should provide broad guidelines concerning the kinds of information that should be used in making claims about products. We simply do not know enough, and may never know enough, for the government to prescribe detailed labeling standards for environmentally correct products. This, of course, will not stop government from engaging in this activity because there will be pressure from all sides to do so.¹¹⁹

Environmental standards are becoming increasingly important in trade negotiations. Vice President Gore says that environmental policies should be considered when the United States is exploring liberalizing trade with a country, and that standards of environmental responsibility should be defined. Where there are global externalities, such as depletion of the ozone layer, I would agree. When countries have primarily local pollution problems, they should be allowed to decide on an appropriate trade-off between the provision of environmental amenities and other goods. Vice President Gore singles out weak enforcement of environmental laws as a potential unfair trading practice. The economic case for limiting trade in this way is weak. Both countries are likely to be better off with trade, even if one has different environmental policies than the other. Moreover, if per capita income in developing countries rises, the residents of these countries are likely to increase their demand for improving the local environment because they will have more discretionary income. The case for American paternalism is not overwhelming in light of these market dynamics.¹²⁰

International lending institutions can play an important role in affecting the environmental policy in developing countries. It is important for these lending institutions to consider environmental impacts when making their lending

117. The rationale for considering government involvement is that information is a public good; however, there are several private organizations that collect and publicize information effectively. One well known one is *Consumer Reports* magazine.

118. Robert J. Samuelson, *The Way We Diaper*, WASH. POST, Mar. 14, 1990, at A17.

119. Consumer groups are likely to find the idea of green labels attractive. Business groups would like the government to set standards that they can live with (or use to gain a competitive advantage). Bureaucrats stand to gain from the emergence of a growth industry within the government. Whether consumers or the environment will benefit remains an open question.

120. But note, there may be a case for paternalism in some cases. See Peter Passell, *Tuna and Trade: Whose Rules?*, N.Y. TIMES, Feb. 19, 1992, at D2.

decisions. While the World Bank has done much good work on the general subject of the environment, it is unclear at this point whether this work is being translated into substantive changes in the way it finances projects.

A final approach that Vice President Gore suggests is to factor in environmental concerns in decisions regarding antitrust law. He uses as an example a paper firm that opposes recycling because of extensive forest holdings and a chemical company that owns a seed company, but will not develop seeds that do not use fertilizers produced by the company.¹²¹ In both cases, if the industries were competitive, other firms could presumably develop the kinds of products that are environmentally friendly, such as recycled paper and new strains of seeds that require fewer pesticides. Problems may arise when there is market power, but these problems are no different qualitatively than standard problems encountered in antitrust. Thus, if antitrust laws can satisfactorily address other forms of market power, they should handle the kinds of examples that Vice President Gore raises. And if they don't, then they should be modified on general principle, and not as a result of environmental policy.

Just as James March developed the garbage can theory of organizations,¹²² Vice President Gore has developed the "kitchen sink" theory of environmental policy design: Use everything you've got in attacking the "problem" and hope for the best. It is an approach that is consistent with the views articulated by many environmental groups who fail to consider carefully how their proposed policies are likely to interact with each other to impact the public. To an economist, this is downright frightening. While there are undoubtedly many good proposals in Mr. Gore's environmental program, he has made no attempt to separate the wheat from the chaff, leaving the reader with no guide as to how to assess the priorities of these prescriptions.

There are signs of hope that the Vice President recognizes the critical weaknesses in the kitchen sink approach. For example, in articulating the American role in the grand environmental policy design, he points out the importance of using prices to induce people to account for environmental externalities imposed on others.¹²³ Yet, at the same time he provides a bold new vision allowing the United States to exercise "leadership," he embraces the kitchen sink approach. His proposals include: an environmental security trust fund, which would simultaneously subsidize "good" technology and be revenue neutral;¹²⁴ a virgin materials fee on products to encourage

121. P. 343.

122. JAMES G. MARCH & JOHAN P. OLSEN, *REDISCOVERING INSTITUTIONS: THE ORGANIZATIONAL BASIS OF POLITICS* 13-14 (1989).

123. P. 348.

124. This proposal is intriguing for several reasons. First, it suffers from the appropriate technology disease. The examples used by the Vice President suggest that he believes a reduction in energy consumption is desirable. If that is the goal, why not just tax energy instead of using a kitchen sink approach? Second, it calls for a revenue neutral tax change that would substitute a carbon tax for income

recycling;¹²⁵ governmental programs that purchase environmentally correct products;¹²⁶ higher mileage standards for cars and trucks sold in the United States;¹²⁷ more stringent efficiency standards for buildings, appliances, and motors;¹²⁸ utility rate reform to encourage conservation;¹²⁹ tree planting programs;¹³⁰ and the accelerated phase-out of chlorofluorocarbons that deplete stratospheric ozone.¹³¹

Without giving a detailed description of each proposal, suffice it to say that many can do more harm than good. A virgin materials fee on products may or may not promote environmental improvement. Recycling is not a good in and of itself. Moreover, proposals for recycling fees frequently ignore other aspects of recycling, such as the increase in energy use and pollution and the possible decline in product quality or the fact that many government programs already promote recycling. It is not clear that we have the insight to know which products are environmentally correct, and even if we did, it is not clear a government would make judicious use of those insights. Higher mileage standards encourage consumers to defer the purchase of new vehicles and are a very expensive way to reduce petroleum consumption. Utility rate reform can be implemented in ways that promote efficient conservation, but there is a real danger that these programs will be poorly designed.¹³² A more reasonable approach is to rationalize pricing in the electric utility industry by increasing competition and defining broad environmental rules with which utilities must comply. More "efficient" standards may be appropriate if energy is underpriced, but why not increase the price of energy if that is the problem? A tree planting program sounds good, but what problems is it likely to solve, and what would the costs be? Moreover, President Bush implemented one, though this does not seem to satisfy Mr. Gore. And finally, there is already an

and payroll taxes, while changing the progressivity in the tax structure and changing the constituency that benefits from this stream of revenues. I do not know whether this is politically feasible (as Senator Gore suggests, p. 349), but I have my doubts because of the large visible wealth transfers that would be involved.

The suggestion of using the tax structure to improve policy raises a broader issue that seems to have been lost in the environmental shuffle. There are a host of analyses that suggest that the tax structure could be modified to help the environment as well as the economy by moving away from inefficient taxes, such as income and payroll taxes, and towards a tax structure that encourages investment and preservation of the environment. See, e.g., Robert Shackleton et al., *The Efficiency Value of Carbon Tax Revenues* (March 27, 1992) (unpublished manuscript, on file with author). These analyses point out that our current tax structure is inefficient, but they fail to explain why green taxes would, in fact, improve efficiency given the underlying political structure in which they would be implemented.

125. P. 349.

126. P. 350.

127. P. 350.

128. P. 350.

129. Pp. 350-51.

130. P. 351.

131. P. 351.

132. See Alfred E. Kahn, *Environmentalists Hijack the Utility Regulators*, WALL ST. J., Aug. 7, 1991, at A10 (questioning whether utility commission and companies are proper agencies to promote and subsidize conservation).

accelerated phaseout of chlorofluorocarbons, so Mr. Gore should be partly satisfied (though I doubt he is).

D. *The Fourth Pillar of the Marshall Plan: Treaties are the Answer, but What Was the Question?*

Dealing with global and regional environmental problems presents difficult political and economic choices. On the one hand, nations would like to preserve their sovereignty and economic way of life. On the other, coordinated action may be required to address the problem successfully. A way out of this dilemma is to develop an international treaty that requires countries to take specified actions. The Montreal Protocol, which reduces the production of ozone-depleting substances, is considered to be an excellent example of such a treaty. Vice President Gore is proposing to expand this model to deal with a host of other global issues, including the limitation of greenhouse gases.

Such treaties have the advantage that they allow for the continuation of the apparent trend toward democracy and capitalism throughout the world. Vice President Gore recognizes the value of both democracy and capitalism as a way of processing information. He also recognizes the severe limitations of statism. In this regard, he seems to be in tune with the great economist, Friedrich von Hayek.¹³³ There is a fundamental tension that is bound to occur when one admits the existence of a global environmental problem.¹³⁴ In order to address such problems, countries will need to cede some authority to a supra-national group for an agreement to be effective. The reason is simple: when each country has an incentive not to enforce an agreement, it is not sufficient to ask each country to enforce the agreement unless there are external monitoring and enforcement mechanisms.

Vice President Gore believes the United States should take a leadership role in developing a new round of environmental treaties. He castigates the Bush Administration for allegedly dragging its feet. In my view, the Bush Administration should be praised for taking a politically *courageous* position at the Rio Earth Summit in 1992. While the European countries were succumbing to pressure from the environmental community on global warming, the Bush Administration decided that the environmentalists were too far ahead of the science. The point is simply that leadership is largely in the eyes of the

133. See, e.g., FRIEDRICH A. VON HAYEK, *THE ROAD TO SERFDOM* (1944) (warning that extended collectivism implied in "social planning" is incompatible with the preservation of a free society).

134. Even so-called Free Market Environmentalists who endorse private property solutions for almost all environmental and resource problems are at a loss to define such solutions for problems in which there are difficulties in defining and enforcing individual property rights. See TERRY L. ANDERSON & DONALD R. LEAL, *FREE MARKET ENVIRONMENTALISM*, ch. 11 (1991). Their approach to these problems is either to downgrade their importance or to admit reluctantly that some form of government-sanctioned market may be appropriate.

beholder and should not be measured by the number of new environmental treaties signed by the United States.¹³⁵

Before launching headlong into signing a series of treaties to protect the environment, the United States should carefully examine the politics, economics and the underlying science that should be the driving force.¹³⁶ Here, it would be wise to note two political realities. First, international environmental treaties are likely to be adhered to more rigorously in this country than in most others. Second, the pressure to sign such agreements is likely to increase over time as the green movement becomes more popular and effective in pursuing its agenda. Real political leadership in this area, in my view, lies in turning attention towards those environmental problems that are important and truly global in scope, and crafting treaties with appropriate incentives to address the issue while rewarding innovation.

E. *The Fifth Pillar of the Marshall Plan: Education and the Thought Police*

There are two basic ideas underlying the Vice President's policy suggestions. First, measures are needed to force people and institutions to be more sensitive to the impact of their behavior on the environment. In economic parlance, this means that the cost of pollution must be internalized. All but one of Vice President Gore's proposals, ranging from population controls to carbon taxes to mandated mileage standards for automobiles, fall into this category. The fifth and final pillar of the Global Marshall Plan represents the Vice President's second approach to policy, which involves an attempt to reshape the attitudes of the public through a massive education campaign.

Mr. Gore wants to design and implement a "worldwide education program to promote a complete understanding of the crisis."¹³⁷ As part of the program children would be asked to collect data, which would allegedly be used to monitor the global environment.¹³⁸ The Vice President believes we need to teach environmental values in the home and in the school so that we can restore the sense of balance between man and nature. With changed values, people would relate to each other differently, and most importantly, they would have a greater reverence for the earth, treating it with respect and placing a higher economic value on preserving the environment. Indeed, the logical outgrowth of this education process is to think about the planet in terms of

135. For an articulate defense of the Bush position at Rio, see C. Boyden Gray, *Put the Forests First*, WASH. POST, June 2, 1992, at A19, and Clayton Yeutter, *Letters to the Editor: The President's Trip to Rio*, WASH. POST, June 12, 1992, at A22.

136. For an analysis of how various factors, including domestic politics, affect the development of international environmental agreements, see Robert W. Hahn & Kenneth Richards, *The Internationalization of Environmental Regulation*, 30 HARV. INT'L L.J. 421 (1989).

137. P. 355.

138. P. 357. I hope for the Vice President's sake that children are more reliable than graduate students. Otherwise, the difficulties in obtaining useful data from this endeavor will be immense.

"spaceship earth," a notion introduced by Kenneth Boulding to illustrate how the economics of a closed system and an open system are fundamentally different.¹³⁹

The author's pitch for education is really about teaching different values. While one can imagine useful educational programs on the environment, one suspects that Vice President Gore's program would resemble religion more than education.¹⁴⁰ The book's energetic tone and partisan fervor have the flavor of a revival meeting rather than a kindergarten. Though the Vice President's passion is to be praised, his approach does not seem particularly receptive to dissenting views.¹⁴¹

IV. WHAT HAPPENED TO POLITICS?

Environmental politics is a key to understanding the type of changes that could take place in environmental policy. Regrettably, Vice President Gore's treatment of the subject is superficial and one-sided. It is incumbent upon the reviewer to complete the picture.

A. *Politics in Mr. Gore's Fantasy World*

The Vice President presents a radically asymmetrical view of environmental politics. Industry lobbyists are described as "self-interested cynics . . . seeking to cloud the underlying issue of the environment with disinformation."¹⁴² Environmental lobbyists, on the other hand, are portrayed romantically. They appear only as individual men and women of humble backgrounds, members of the environmental "resistance," who have "taken the fight for the environment from the scientific journals and symposia to their own backyards and from there to corporate board rooms and the halls of Congress."¹⁴³

Mr. Gore's presentation of environmental politics is incomplete, and—frankly—wrong. While he correctly points out that industry has an axe to grind, he chooses to ignore strategic manipulation of the process by the environmental community. Not once in the book does the author suggest that

139. Kenneth E. Boulding, *The Economics of the Coming Spaceship Earth*, in ENVIRONMENTAL QUALITY IN A GROWING ECONOMY (Henry Jarrett ed., 1966). As a metaphor, Boulding's spaceship earth has a certain appeal. The analogy should not be taken too far, however, since earth is not a closed system with respect to energy. Nonetheless, it reminds us that the earth should be treated as our home for the foreseeable future and we should not squander the earth's resources.

140. For works discussing examples of dogma masquerading as environmental science, see Robert W. Hahn, *The Politics and Religion of Clean Air*, REGULATION, Winter 1990, at 21; Lindzen, *supra* note 40, at 87.

141. See *supra* Part V(C)(1).

142. P. 360 (describing attempts by the National Coal Association to persuade parts of the electorate that global warming is not an important issue).

143. P. 292.

environmentalists may use information to their own advantage. On the contrary, he accepts their debating points without question.¹⁴⁴

This skewed picture does not reflect naivete on the part of the author, but cunning. Mr. Gore wishes to avoid offending the many environmentalists who embrace him as a folk hero. He knows that his proposals will appeal to them, not least because they amount to a full-employment act for environmental interest groups. At the same time, Mr. Gore renders his proposals more palatable to the general public by fostering the illusion that they would be painless to implement.¹⁴⁵ Thus, while the Vice President claims to have grown impatient with his tendency to test the "political winds,"¹⁴⁶ his unrealistic analysis of the political scene suggests that his weather vane is still working quite well.

B. *Politics in the Real World*

In the real world, environmental groups are key players in the formulation of policy. Among mainstream groups, two important trends may be identified: the continued resort to public relations as the weapon of choice, and an increased willingness to use economic instruments.

1. *Green and Yellow Journalism*

Environmental groups have become increasingly skilled at manipulating the media. Consider the alar scare,¹⁴⁷ the Love Canal "disaster,"¹⁴⁸ and the Arctic ozone hole.¹⁴⁹ In the first case, apples sprayed with alar were removed from the market despite the fact that there was widespread agreement that the risks were de minimis and the costs of this action were large.¹⁵⁰ In the case of Love Canal, an entire neighborhood was closed down only to find that the risks were overstated—people are now moving back in;¹⁵¹ in the case of the North American ozone hole, the press reported the preliminary finding with great fanfare, but was characteristically subdued in reporting its retraction.¹⁵²

144. For example, see Mr. Gore's discussion of Love Canal at pp. 209-10.

145. The Vice President here ignores one of the key insights of economics, the "TANSTAAFL" principle: there ain't no such thing as a free lunch.

146. P. 15.

147. The Natural Resources Defense Council received substantial publicity when it orchestrated the ban on Alar with the help of actress Meryl Streep. Michael Weisskopf, *From Fringe to Political Mainstream: Environmentalists Set Policy Agenda*, WASH. POST, April 19, 1990, at A1, A16;

148. Lois Ember, *Love Canal: Uncertain Science, Politics, and Law*, in CHRISTOPH HONENEMSEN & JEANNE X. KASPERSON, *RISK IN TECHNOLOGICAL SOCIETY* 77-95 (1982).

149. See Gregg Easterbrook, *Green Cassandras*, NEW REPUBLIC, July 6, 1992, at 24. ("It's just that, ummm, there never was any Northern ozone hole.").

150. Eliot Marshall, *A is for Apple, Alar, and . . . Alarmist?*, 254 SCIENCE 20 (1991).

151. See Laurie Goodstein, *Back to Love Canal: A Symbol of Toxic Waste Hazards*, WASH. POST, June 21, 1990, at A3.

152. See ELIZABETH M. WHELAN, *TOXIC TERROR* 87-105 (1985); Bob Davis, *Hole in Ozone Didn't*

Global warming is the ultimate example of media alarmism. Aaron Wildavsky has called it "the mother of environmental scares."¹⁵³ As Richard Lindzen has observed:

[C]urbing 'global warming' is identified with saving the whole planet [T]he threat of warming fits in with a variety of preexisting agendas—some legitimate, some less so: energy efficiency, reduced dependence on Middle Eastern oil, dissatisfaction with industrial society (neopastoralism), international competition, governmental desires for enhanced revenues (carbon taxes), and bureaucratic desires for enhanced power.¹⁵⁴

Proponents of these various agendas use the issue to justify massive changes in transportation policy and natural resource use, as well as in manufacturing, forestry and agricultural practices.

Unfortunately, these are not isolated examples,¹⁵⁵ and there is no reason to believe the dynamic will change any time soon. Environmentalists will continue to compete for contributions, the press will continue to need stories, and politicians will continue to recognize the advantages of using the environment as an issue for gaining broad public support.

2. *The Environmentalists and Adam Smith*

Many environmental groups are beginning to appreciate that the basic economic system is here to stay, and that price signals are a potent mechanism for changing behavior.¹⁵⁶ In tune with this trend, Mr. Gore advocates the use of incentive-based approaches to environmental control such as marketable permits and taxes. He also argues that we should move away from taxes on labor, and toward taxes on pollution. In this regard, he is likely to be supported by many environmentalists.¹⁵⁷

Develop, NASA Reports, WALL STREET J., May 1, 1992, at B12; *Letters to the Editor: Big Holes in the Ozone Studies*, WALL ST. J., Apr. 15, 1992, at A21; *Letters to the Editor: The Dreaded Ozone Hole*, WALL ST. J., Mar. 10, 1992, at A19; *Press-Release Ozone Hole*, WALL ST. J., Feb. 28, 1992, at A14.

153. Aaron Wildavsky, *Global Warming as a Means of Achieving an Egalitarian Society: An Introduction*, in ROBERT C. BALLING, JR., *THE HEATED DEBATE: GREENHOUSE PREDICTIONS VERSUS CLIMATE REALITY* xv-xvi (1992).

154. Lindzen, *supra* note 40, at 96.

155. For a recent article exposing the environmental camp's subordination of rational policy to public relations, see Raymond Bonner, *Crying Wolf over Elephants*, N.Y. TIMES, Feb. 7, 1993, § 6 (Magazine), at 16 (describing how conservation groups reversed their position on the advisability of banning ivory when they discovered that hyping the threat to elephants is a highly effective device for obtaining funds and publicity).

156. See Dudek & Leblanc, *supra* note 111; Jessica Mathews, *Science, Uncertainty, and Common Sense: Greenhouse Warming is the Moral Equivalent of the Cold War*, WASH. POST, Nov. 3, 1991, at C7.

157. See ROBERT REPETTO ET AL., *GREEN FEES: HOW A TAX SHIFT CAN WORK FOR THE ENVIRONMENT AND THE ECONOMY*, WORLD RESOURCES INSTITUTE, WASHINGTON, D.C. (1992).

But while there is some consensus on the theoretical desirability of using economic instruments, there is less agreement on which problems most urgently require attention.¹⁵⁸ Even within the environmental community, there is widespread disagreement on this question. This disagreement rarely surfaces because environmentalists are unwilling to rank the importance of environmental issues in a public setting. If they did so, they might give the public the dangerous—and correct—impression that some of their issues are less important than others.¹⁵⁹

The great appeal of economic instruments is that they help delay fundamental disagreements over goals. By lowering the cost of achieving particular objectives, they allow society to enjoy increased environmental protection along with economic growth. Accordingly, we may expect to see greater experimentation with these approaches over the next decade.

This is not to say that the right and the left will coalesce any time soon. Fundamental differences on the desirability of centralized solutions remain. At one extreme lie the “free market” environmentalists, who argue that private property rights in conjunction with the common law can successfully address most problems.¹⁶⁰ At the other extreme lie the deep ecologists and the members of Greenpeace, who reject the ideal of linking improved environmental quality with economic growth. Nothing short of a move back to pre-industrial civilization would satisfy this wing of the movement.¹⁶¹ Though Vice President Gore flirts with deep ecology, he ultimately recognizes the futility of trying to put the genie back in the bottle.¹⁶²

V. SUSTAINABLE DEVELOPMENT AS A UNIFYING THEME

Questions involving complex environmental issues such as global warming and the preservation of species diversity cry out for a unifying framework. If I had to attribute an underlying rationale for the prescriptions offered in the book, it would be the promotion of “sustainable development.” The problem

158. There is also substantial disagreement about how broadly these instruments might be applied and how effective they are likely to be. See, e.g., ANDERSON & LEAL, *supra* note 134 (offering a conservative view).

159. The problem is analogous to that of organizing a cartel, where each individual member may have an incentive to produce beyond the allocated quota. In the case of environmental groups, there is an incentive to maintain a posture suggesting that improving the environment is the most important challenge facing mankind, and that most, if not all, environmental issues should be viewed as crises. This position helps increase the pool of resources going to environmental groups and environmental problems. At the same time, these groups compete, sometimes fiercely, within this large tent. They do so in a variety of ways by offering different kinds of services to their supporters. See, e.g., Riley E. Dunlop & Angela G. Mertig, *The Evolution of the U.S. Environmental Movement from 1970 to 1990: An Overview*, 4 SOC'Y & NAT. RESOURCES 209-18 (1991).

160. See ANDERSON & LEAL, *supra* note 134.

161. For example, Paul Watson, former leader of Greenpeace, suggests that human beings are “the AIDS of the Earth.” Robert H. Nelson, *Unoriginal Sin: The Judeo-Christian Roots of Ecotheology*, POL'Y REV., Summer 1990, at 52, 57.

162. Pp. 216-37.

is that sustainable development is difficult to define and operationalize. After providing several definitions of sustainable development, this Part compares two approaches to policymaking—one which I call the “policy analytic approach,” and a second, embraced by Vice President Gore, which I call the “visionary approach.” While the two approaches are markedly different, this Part argues they are both useful ways of groping toward a sustainable future.

A. *Defining Sustainable Development*

The notion of sustainable development was highlighted in the Brundtland Report.¹⁶³ Since that time a large literature has emerged on its meaning and application to environmental issues. It is a wonderful, “politically correct” concept, which attracts adherents from across the political spectrum. Part of its political appeal lies in the fact that it can mean different things to different people. Unfortunately, the fuzziness of this concept is precisely what makes it difficult to evaluate rigorously.

There is not to my knowledge a widely accepted definition of sustainable development, yet there is no dearth of candidates.¹⁶⁴ For example, some economists have argued that a sustainable policy is one that maximizes a discounted sum of utilities across generations.¹⁶⁵ Others have suggested that this maximization be modified to include the constraint that each succeeding generation enjoy a higher level of utility than the preceding one.¹⁶⁶ The advantage of the utilitarian framework is that it formally links changes in policies to changes in “well-being” of specific individuals or generations of individuals. The principal drawback from the policy standpoint is the difficulty in measurement. How do we measure whether a modest tax, say on carbon, is likely to improve or hurt future generations? Moreover, much of what people are concerned about here are zero-infinity type dilemmas, in which there is a very low probability of a high consequence event, such as the earth no longer being habitable.¹⁶⁷ This could be accommodated in a utilitarian framework by maximizing some function of a stream of utilities (say the discounted sum), subject to the constraint that the probability of extinguishing life as we know

163. WORLD COMMISSION ON EMPLOYMENT AND DEVELOPMENT, OUR COMMON FUTURE 8-9 (1987).

164. See, e.g., ROBERT GOODLAND, ET AL., ENVIRONMENTALLY SUSTAINABLE ECONOMIC DEVELOPMENT BUILDING ON BRUNDTLAND 1-4 (World Bank Environment Working Paper No. 46, 1991); *Inheriting the Earth*, ECONOMIST, Sept. 16, 1989, at 77; Robert M. Solow, Sustainability: An Economist's Perspective, Lecture at Woods Hole Oceanographic Institute (June 14, 1991) (unpublished manuscript, on file with author); Michael A. Toman & Pierre T. Crosson, Economics and Sustainability: Balancing Tradeoffs and Imperatives (Jan. 1991) (unpublished manuscript, on file with author).

165. John Pezzey, Sustainability, Intergenerational Equity, and Environmental Policy (August 20, 1989) (unpublished manuscript, on file with author).

166. *Id.*

167. Talbot Page, *A Generic View of Toxic Chemicals and Similar Risks*, 7 ECOLOGY L.Q. 207, 208-12 (1978).

it does not increase with time.¹⁶⁸ Yet, it is by no means obvious that discounting makes sense as a decision rule for dealing with such events, even if we could measure these outcomes.

A second group of definitions focuses on opportunity.¹⁶⁹ Ideally, one might like to afford a larger set of opportunities to future generations than those afforded to us. This may mean greater access to different kinds of experiences, including those involving environmental amenities. Like utility, however, the idea of opportunity presents measurement problems. Moreover, the evolution of technology and use of resources means that some opportunities are likely to be more difficult to experience. For example, it is less likely that people in the twenty-first century will be able to "get away from it all" in a Walden Pond-like setting without fax machines or portable telephones. Thus, the objective may not be attainable.

Related to the notion of opportunity is the preservation of various kinds of capital—most notably natural capital.¹⁷⁰ Typically natural capital is divided between renewable resources, such as forests used for logging, and nonrenewable resources, such as fossil fuels and the ozone layer.¹⁷¹ Some scholars have argued for the preservation of natural capital, on the theory that it is fundamentally different from man-made capital and the general stock of human knowledge that is transmitted from one generation to the next.¹⁷² I am sympathetic to this argument. Yet, the environment is only one part, albeit an important one, in the formation of values and lifestyles. Economic, political and social institutions also play prominent roles. These institutions, of course, both shape and are shaped by the environment in which we live.

Narrow and formal interpretations of utility or an ad hoc definition of the resource base are inadequate to define sustainability. Sustainability is about maintaining or enhancing the quality of life for each successive generation while not threatening life as we know it. Quality of life, however, is intrinsically difficult to define as is the threat to life as we know it. Nevertheless, I think the definition underscores several important points. First, the environmental concerns highlighted by Mr. Gore are likely to be only one factor in determining the quality of life and the threat to life as we know it. For example, the threat of nuclear war is a critical issue in assessing the future

168. I ignore the formidable problems of defining "life as we know it," but one could relate it to extinction or catastrophic losses in human life or cultures.

169. See Pezzey, *supra* note 165; Toman & Crosson, *supra* note 164.

170. There are substantial problems in defining and measuring natural capital, but they are more readily addressed than abstract utilitarian notions of sustainability. The natural resource stock will have to be translated into a common metric, such as monetary units, to compare the impacts of different policies.

171. The distinction between renewable and nonrenewable resources is somewhat arbitrary. Most resources can be renewed or replenished, but the time it takes to do so may be long relative to a human's life span. Thus, the ozone layer can be preserved through the reduction of chlorofluorocarbon production, but it will take decades for this policy to have an effect because of the long residence times of these chemicals in the atmosphere.

172. See, e.g., DAVID PEARCE ET AL., BLUEPRINT FOR A GREEN ECONOMY (1990).

habitability of the planet. Second, quality of life depends on more than the environment. Economic, political and social institutions all play a critical role.

This brief review of sustainable development suggests that it is difficult to determine, except in extreme instances, whether a particular set of policies are more or less sustainable than the status quo. The narrower the definition, the easier it is to determine, but the less satisfactory the concept.

Even if we cannot determine in any deep sense whether most policies enhance sustainable development, economics offers two useful insights about the nature of policies that could affect sustainability. The first is that productive investment leads to greater consumption in the future at the expense of less consumption today. Thus, if we believed that the quality of life could decline, we should search for productive investments to improve that quality of life. The second insight is that prices of environmental and natural resources that do not include their external costs, such as the impact of pollution on health, are likely to result in excessive consumption of these resources.¹⁷³

B. *Using Policy Analysis as an Aid to Achieving Sustainable Development*

To address the problems that lie ahead, we need to move beyond mere platitudes concerning sustainability and improvements in the quality of life and begin to provide a concrete definition of the problems we wish to solve along with a serious analysis of the kinds of tools we might use. For example, if our major concern were preventing global warming, that would imply a very different strategy than if our major concern were reducing the number of people whose lives are not satisfying (in a material or spiritual sense). Vice President Gore says both of these problems are urgent: the "strategic threat, global warming, is the most dangerous of all";¹⁷⁴ and "the worst of all forms of pollution is wasted lives."¹⁷⁵ Elsewhere, Vice President Gore has identified yet a third problem, hazardous waste, as "the most significant environmental health problem of the decade."¹⁷⁶ Even allowing him some leeway for rhetorical flourish, Gore seems oblivious to the necessity of making trade-offs.

173. A standard environmental economics text would argue that there are private costs and external costs, the sum of which yield social costs. See TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 45-47 (1988). Optimality is sometimes defined as the point at which marginal social cost is equal to marginal social benefit. This notion of optimality is central to microeconomic analysis of environmental problems, yet the measurement of an external cost is not straightforward. For example, how do we estimate and measure the impact of an additional ton of carbon dioxide in the atmosphere? People disagree on the impact of projected CO₂ emissions on climactic conditions. Moreover, the analysis typically assumes that the existing income distribution is appropriate for determining the so-called optimal policy. This assumption on distribution can be modified by imposing different weights on people with different income classes.

174. P. 89.

175. P. 162 (emphasis omitted).

176. Ronald Bailey, *Captain Planet for Veep*, NAT'L REV., Sept. 14, 1992, at 40, 43.

Among the most difficult trade-offs that must be made are between today's environmental problems and those of the future. Buying an "insurance" policy, such as a modest carbon tax, may make sense for addressing climate change, depending on your degree of risk aversion and your views on the theory. It makes no sense if the primary concern is with helping the have-nots who are alive today. Even if the concern is with promoting environmental quality, a strong case can be made for implementing policies that alleviate human suffering and promote economic growth. The challenge is to promote such policies in a way that also improves the local environment. Approximately 1.7 billion people lack access to basic sanitation, leading to widespread disease in children and adults.¹⁷⁷ Problems also arise because of lack of clean water. These are basic human problems, and they are also environmental problems.

Vice President Gore does not lose sight of such immediate problems; he simply fails to make the hard choices. Since the hard choices will be made one way or another, it makes sense to develop a strategy for thinking about them. Here, policy analysis and economics provide a useful guide.

Policy analysis, broadly construed, involves two key components—a description of the state of a system of concern to humans, and a theory that defines the relationship between that system's inputs and outputs. For example, if one were concerned about the impacts of the 1990 Clean Air Act Amendments, one would attempt to measure the state of the "system" before and after the law was implemented. The state of the system could be measured in many ways, including direct measures of environmental quality, the number of regulations, the costs of the regulations, and the nature of the regulations. Thus, policy analysis provides a way of summarizing a complicated system using a few key variables that are of interest to the policy maker. It is thus analogous to a standard accounting system that could be used to summarize the health of a business.¹⁷⁸

First, one needs to define the nature of the problems that need to be examined. For example, one might consider different ways to operationalize notions of sustainability and different objectives for environmental policy.

A second logical step, in the case of sustainability, would be to explore the strengths and weaknesses of various policies in achieving environmental objectives. It might be useful to know, for example, the cost of a policy to stabilize carbon dioxide emission levels at 1990 levels and its likely effect on the global temperature profile. The focus here should be on "policy-relevant" research rather than the pursuit of science to push back the frontiers of knowledge. While I am a great supporter of both endeavors, the United States

177. WORLD BANK, *WORLD DEVELOPMENT REPORT* 1992, at 5 (1992).

178. For a more detailed discussion of technical approaches to policy analysis, see EDITH STOKEY & RICHARD ZECKHAUSER, *A PRIMER FOR POLICY ANALYSIS* (1978). For an insightful discussion of policy design, see David L. Weimer, *Claiming races, broiler contracts, heresthetics, and habits: ten concepts of policy design*, 25 *POL'Y SCI.* 135 (1992).

government does not always organize its research efforts in ways that produce useful and timely policy insights. With the potentially staggering resources we could spend on reducing greenhouse gas emissions, it is important to have a strategy to spend research dollars in ways that will produce useful insights.¹⁷⁹ It is also important to consider policies in light of the political constraints likely to be imposed on policymakers.¹⁸⁰ Developing "optimal" economic approaches may be of little value to policymakers who are constrained by political forces. Finally, the linkages between policies need to be explored more fully, including the linkages between population growth and resource use, and freer trade and the environment.

A pervasive feature of many of the problems in the environmental area is an uncertain relationship between policies and outcomes. Take, for example, the problem of estimating the impact of a \$100/ton carbon tax on climate change. First, one must estimate how the tax is likely to change fuel use patterns in the short and long term. Then, one must estimate how these changes are likely to be translated into changes in temperature. Both of these exercises are subject to great uncertainty. These uncertainties should be analyzed and their significance should be effectively communicated to decisionmakers.¹⁸¹

Since different decisionmakers will have different criteria for a particular problem, it would be useful to spell out how preferred policies are likely to change with different criteria. For example, suppose three decisionmakers are assigned the task of choosing a carbon tax. The first is risk-neutral, the second is risk-averse, and the third is particularly concerned with preventing an environmental catastrophe. Suppose further that these three decisionmakers are in agreement on the distribution of benefits and costs from various tax levels in terms of their effect on the environment and the economy. The risk-neutral decisionmaker might select a modest tax or no tax, the risk-averse decisionmaker would select a higher tax, and the decisionmaker concerned about avoiding the unlikely event of a catastrophe might select a still higher tax.¹⁸²

After linking objectives and outcomes for various problems, one has to prioritize problems and decide how to proceed. While this prioritization is, of necessity, highly subjective, it can be aided by analysis. Moreover, this

179. See, e.g., Edward S. Rubin et al., *Keeping Climate Research Relevant*, ISSUES IN SCI. & TECH., Winter 1991-92, at 47.

180. See, e.g., Robert W. Hahn & Robert N. Stavins, *Incentives for Environmental Protection: Integrating Theory and Practice*, 82 AM. ECON. REV. 464 (1992); Robert W. Hahn, *The Political Economy of Environmental Regulation: Towards a Unifying Framework*, 65 PUB. CHOICE 21 (1990).

181. See, e.g., M. GRANGER MORGAN & MAX HENRION, *UNCERTAINTY: A GUIDE TO DEALING WITH UNCERTAINTY IN QUANTITATIVE RISK AND POLICY* (1992).

182. The tax example is used for illustrative purposes only. I am not endorsing taxes as the preferred instrument for addressing this issue.

prioritization could take place using a number of criteria, which may or may not relate to economic efficiency.

This kind of analytical process is likely to yield several insights that are conveniently glossed over in Vice President Gore's presentation. First, and most important, the Vice President's policy prescriptions are likely to be quite expensive—I suspect they would cost hundreds of billions of dollars annually for the United States alone.¹⁸³ Second, while a few of his suggestions may enhance our international competitiveness (read our standard of living), the lion's share of his policies are likely to reduce the material quality of life that most Americans enjoy, at least in the short term.¹⁸⁴ Third, the appropriate or preferred strategy for addressing a particular issue will depend on a variety of factors. Only in rare instances is a kitchen sink approach justified when one considers the costs.

Policy analysis has room for a wide range of perspectives. It includes conventional cost-benefit analysis as practiced by economists, but it is far broader. Thus, people not comfortable with the objectives specified in conventional economic analysis can substitute their desired objectives. Moreover, if we place suitable constraints on the problem, we can include issues related to political feasibility in policy analysis. For example, we could

183. This is a crude estimate based on the view that significant reductions in greenhouse gas emissions could be comparable to the current cost of environmental programs, which are in this range. See, e.g., ALAN S. MANNE & RICHARD S. RICHELS, *BUYING GREENHOUSE INSURANCE: THE ECONOMIC COSTS OF CARBON DIOXIDE EMISSION LIMITS* 45-66 (1992). Of course, Gore's prescriptions merely start with global warming. Thus, an estimate of \$100 billion annually would probably be a lower bound. Moreover, the cost to the world could be several times that amount. See REPORT OF THE ADMINISTRATOR, ENVIRONMENTAL PROTECTION AGENCY, *ENVIRONMENTAL INVESTMENTS: THE COST OF A CLEAN ENVIRONMENT* (1991) for estimates of current environmental expenditures in the United States.

184. There is a popular mythology to which Vice President Gore and many of his followers adhere that tighter economic standards will increase U.S. competitiveness. See, e.g., Michael Porter, *America's Green Strategy*, SCI. AM., April 1991, at 168. While there is not much data to support or refute this argument, it is questionable on first principles. Define U.S. competitiveness by the average standard of living of the U.S. citizen. (Whether this standard of living is measured by income per capita or some adjusted measure that includes environmental degradation is not particularly important for this argument.) I can imagine two basic reasons why tighter standards would increase the average standard of living. The first is that we are under-regulating particular pollutants relative to some optimum that economists might define. A good example of such a pollutant would be airborne lead emissions from burning leaded gasoline. Indeed, this was a primary motivation for removing the lead from gasoline. Unfortunately, the data suggest that, at least for the United States, a large class of pollutants tend to be over-regulated rather than under-regulated, which is the main reason why the incremental costs of most proposed environmental regulations tend to exceed the benefits.

A second rationale for supporting tighter standards as a way of promoting competitiveness is based on a dynamic argument. The argument assumes the government has the ability to identify industries in which the United States has comparative advantages and is able successfully to stimulate their development. Thus, some people believe that the United States has or can have a comparative advantage in producing pollution control equipment and other environmental products. The proposition that government can redirect investment to its most highly valued uses is highly dubious in most cases. Indeed, the U.S. government has not been particularly astute in choosing economic winners in the marketplace and frequently continues projects even after it is obvious they are economic losers. See, e.g., LINDA R. COHEN & ROGER G. NOLL, *THE TECHNOLOGY PORK BARREL* (1991). Thus, while the data are limited, arguments based on first principles suggest the burden of proof should lie with those who believe that tighter standards will improve living standards.

design an energy tax in such a way as to ensure that producers and/or specific consumer groups are likely to be better off than they are now. In the age of personal computers, quantitative policy analysis offers a useful guide for developing and evaluating policies to promote sustainable development.

C. *The Visionary Approach to Sustainable Development*

Vice President Gore's visionary approach to sustainable development is a curious blend of religion, revolutionary zeal, and homespun economics. This Section critically examines four defining characteristics of this visionary approach: (1) its religious dimension; (2) its assumption that attitudes are malleable; (3) its reliance upon big government; and (4) its ambivalent attitude toward economics.

1. *Religious Aspects*

Visionary approaches are almost of necessity religious in nature.¹⁸⁵ Vice President Gore's religious zeal emerges most clearly when he depicts environmental politics as an epic battle between good and evil. There is something disturbing about the author's use of military imagery in this context. Mr. Gore's green activists are "comrades in arms"—and like the Marxists before them, they are fighting the excesses of capitalism.¹⁸⁶ One fears that, also like the Marxists before them, they will demonstrate little tolerance for opposing views.

Faint hints of such intolerance may be detected in the book. Vice President Gore occasionally shows a lack of respect for people who do not share his perspective, or conclusions. For example, he implies that skeptics on global warming are less than "reputable."¹⁸⁷ Yet, as several scientists have noted, the debate is far from settled.¹⁸⁸ Ironically, while Vice President Gore expresses disdain for the skeptics on global warming, he praises one of the greatest skeptics of all time—Galileo—for daring to change our views of the earth's relation to the universe.¹⁸⁹

185. See Nelson, *supra* note 161, at 52 (arguing that "environmental policy-making often turns out to be a battlefield for religious conflict"); see also Hahn, *supra* note 140, at 21-30. For an insightful critique of the inherent biases in economic thought, see ROBERT H. NELSON, *REACHING FOR HEAVEN ON EARTH: THE THEOLOGICAL MEANING OF ECONOMICS* (1991).

186. P. 293.

187. P. 89.

188. See, e.g., Lindzen, *supra* note 40, at 87-98. Mr. Gore also conveniently fails to note that many scientists were deeply concerned about global cooling just twenty years ago. Moreover, chlorofluorocarbons (CFC's), thought to be one of the most potent greenhouse gases just a year ago, are now thought to have a negligible *net* impact on the problem of warming because the impact of the CFC's is counter-balanced by the reduction in stratospheric ozone. CFC's still are thought to be a critical factor in the depletion of stratospheric ozone. See WORLD METEOROLOGICAL ORGANIZATION, *GLOBAL OZONE RESEARCH AND MONITORING PROJECT REPORT NO. 25, SCIENTIFIC ASSESSMENT OF OZONE DEPLETION* xi, xv (1991).

189. P. 40.

There are two key dangers in Mr Gore's absolutism. First, it may foster among his followers a culture of intolerance, characterized by a distorted view of reality. Second, it may dampen the enthusiasm of serious social scientists and natural scientists to engage in the environmental policy debate, where their input could be critical to designing policies that help promote sustainable development.

2. *The Difficulty in Reshaping Attitudes*

Vice President Gore wants to ameliorate environmental policy by prompting changes in public attitudes. "[A]s changes in our thinking about the environment take place, we can expand the range of what is politically imaginable."¹⁹⁰ In a sense, he is correct—changes in paradigms can have a dramatic impact on policies and human behavior. And as Keynes pointed out, we are often prisoners of the ideas of defunct academicians.¹⁹¹

Unfortunately, this part of the visionary approach is based on a false view of human nature. It is likely to fail because people tend to resist fundamental change, especially when it conflicts with their narrow self-interest. Moreover, the Vice President's recipe for changing the views of key decisionmakers does not adequately reflect political realities.

Vice President Gore believes that a main source of our crisis can be traced back to the decisionmakers. "The problem is not so much one of policy failures: much more worrisome are the failures of candor, evasions of responsibility, and timidity of vision that characterize too many of us in government."¹⁹² The solution, Mr Gore believes, lies in dramatically changing attitudes "to remove constant pressures exerted by population growth, greed, short-term thinking and misguided development."¹⁹³

The problem is that politicians have little incentive to change their behavior. Mr. Gore disarmingly notes the irony in his own behavior. For example, he uses chlorofluorocarbons in his automobile "on the way to a speech about why they should be banned."¹⁹⁴ While Senator, Mr. Gore also failed to vote his environmental conscience on many issues where his interest in reelection evidently dominated. He has voted to continue sugar subsidies, and to fund construction of the Clinch River Breeder Reactor and the Tellico

190. P. 178.

191.

[T]he ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.

JOHN MAYNARD KEYNES, *THE GENERAL THEORY OF EMPLOYMENT INTEREST AND MONEY* 383 (1936).

192. P. 11.

193. P. 125.

194. P. 15.

Dam—two projects that happen to be located in Tennessee, but were opposed by environmentalists.¹⁹⁵ Apparently, Mr. Gore's personal and political actions have not yet caught up with his bold vision.

None of these decisions should surprise us. Vice President Gore is a politician and a human being. As such, he is largely governed by self-interest. Unfortunately, Vice President Gore seems to have forgotten this in painting his picture. He envisions a wonderful public policy heaven, but fails to explain why it will serve the interests of powerful groups (other than environmentalists) to embrace his vision. He may have succumbed to a sort of *Field of Dreams* logic—if you build it, they will come—but this logic works better in Hollywood than in the real world.

3. *Using Government to Lead the Way*

Vice President Gore exhibits some ambivalence about the role of government in addressing environmental problems. At one level, he recognizes the potential excesses associated with government and government intervention. He realizes that nations are unlikely to give up their sovereignty.¹⁹⁶ He also notes that “world government” is definitely not the solution.¹⁹⁷ Moreover, he recognizes that some government policies have been disastrous for the environment, noting:

The most serious example of environmental degradation in the world today are tragedies that were created or actively encouraged by governments—usually in pursuit of some notion that a dramatic reordering of the material world would enhance the greater good. And it is no accident that the very worst environmental tragedies were created by communist governments, in which the power of the state completely overwhelms the capabilities of the individual steward. Chernobyl, the Aral Sea, the Yangtze River, the “black town” of Copsa Mica in Romania—these and many other disasters testify to the severe environmental threats posed by statist governments.¹⁹⁸

Despite this sensitivity to the excesses of government, Vice President Gore seems not to care that his proposals would lead to tremendous growth in bureaucracy throughout the world. Organizing a worldwide education network, passing regulations on appropriate labeling, deciding which products the government can purchase, and implementing many new taxes, including a

195. See Bailey, *supra*, note 174, at 43; see also 34 CONG. Q. ALMANAC 117-H (1978) (vote in favor of HR-12928); 35 CONG. Q. ALMANAC 71-H (1979) (vote in favor of HR-4388).

196. P. 301.

197. P. 302.

198. Pp. 247-48.

carbon tax, are nontrivial exercises that would expand bureaucracy significantly.

The Vice President's position can be explained only by a naively optimistic view of bureaucracies and their power to improve conditions.¹⁹⁹ Anyone who has dealt with the Environmental Protection Agency knows that bureaucracies have strong vested interests in maintaining the status quo and little incentive to promote the kind of cost-effective innovation needed to improve living standards.²⁰⁰ Bureaucrats rarely get credit for approving process or product innovations that succeed; but they can get blamed for approving a gadget or process that fails. Thus, regulators frequently have an incentive to stifle innovation rather than promote it.²⁰¹

4. *The Love-Hate Affair with Economics*

Vice President Gore may like living things, but he has very little patience with conventional economics or economists. He derides the conclusion from the 1989 *Economic Report of the President*,²⁰² assembled by the Council of Economic Advisers, that "there is no justification for imposing major costs on the economy in order to slow the growth of greenhouse gas emissions."²⁰³ The statement undoubtedly rested on a comparison of subjective estimates of the benefits and costs of taking major action now to reduce greenhouse gas emissions versus the benefits and costs of waiting. Waiting has several drawbacks, as Vice President Gore is quick to point out, but it also has several advantages.²⁰⁴

The Vice President's approach talks about using economics, but remains weak on the details. This reflects, in part, his propensity for big-picture thinking. Unfortunately, the devil often lurks in the details. Economics, science, engineering, and law provide useful tools and frameworks for understanding how those details interact.

The Vice President's tin ear for economics is evidenced by his position on the issue of "dead zones." He expresses outrage that companies wish to buy property around their manufacturing plants to reduce public exposure to extremely low levels of airborne toxic emissions. Vice President Gore asserts that such firms would be creating "dead zones"; yet the data strongly suggest

199. See STEVEN KELMAN, *MAKING PUBLIC POLICY* (1987).

200. See Francis S. Blake, *The Environment: Does Washington Know Best?*, AM. ENTERPRISE, Mar.-Apr. 1990, at 6-7.

201. See, e.g., Fred L. Smith, *Conclusion: Environmental Policy at the Crossroads*, in ENVIRONMENTAL POLITICS: PUBLIC COSTS, PRIVATE REWARDS (Michael S. Greve & Fred L. Smith eds., 1992).

202. COUNCIL OF ECONOMIC ADVISERS, *ECONOMIC REPORT OF THE PRESIDENT* (1989).

203. P. 195.

204. For example, waiting allows money that would have been spent on reducing greenhouse gas emissions to be spent on other pressing needs; it allows new, more effective technology to emerge; and most importantly, it allows new information to surface that could provide a better basis for decisionmaking.

that the health benefits of reducing air toxics emissions are minuscule, while the costs are in the billions of dollars annually.²⁰⁵

When the Vice President embraces different solutions, he fails to note potential interactions associated with different policies. For example, he overlooks the possibility that raising fuel economy standards would increase pollution by providing an incentive for people to extend the life of their old clunkers before purchasing a new, cleaner vehicle. A second example relates to his prescriptions for controlling carbon dioxide, a key greenhouse gas. Vice President Gore advocates both a domestic tax to raise money for his trust fund and an international marketable permit system. He fails to recognize that these two instruments are really aimed at doing the same job within the United States, since they both place an explicit price on limiting the amount of carbon dioxide going into the atmosphere.²⁰⁶

Vice President Gore exhibits a love-hate relationship with economics. While he pays lip service to cost-benefit analysis, he is disdainful of approaches taken by conventional microeconomists. Mr. Gore notes that there is no better method of reducing pollution "than finding ways to put a price on the environmental consequences of our choices, a price that would be reflected in the marketplace."²⁰⁷ He exhorts the nation to harness "the power of market forces to help save the global environment."²⁰⁸ And he expresses an interest in identifying "the most effective and least costly solutions [to the] crisis."²⁰⁹ These sentiments are music to an economist's ears.

Unfortunately, the author never defines the "crisis" very carefully. Absent a clear definition of the problem, it is difficult to evaluate the proposed policy prescriptions. In any case, he makes no attempt to identify the costs or benefits of these prescriptions. The reader is left with a partial vision and a full bag of policy tools. But what would happen if these tools were actually used? Are we to assume that it would be all gain and no pain on the part of the citizenry?

Vice President Gore views economics as a method for selecting the best means to an end. This is a perfectly valid use of economics. The problem the economist confronts in implementing Mr. Gore's vision is that it is difficult to talk about appropriate means until the ends are more clearly specified. Mr. Gore's failure to make the hard calls on prioritizing problems, even within the environmental arena, makes it virtually impossible to implement his vision.

205. See, e.g., Hahn, *supra* note 140, at 21; Paul R. Portney, *Economics and the Clean Air Act*, J. ECON. PERSP., Fall 1990, at 173; Frederick H. Rueter & Wilbur A. Steger, *Air Toxics and Public Health: Exaggerating Risk and Misdirecting Policy*, REGULATION, Winter 1990, at 51.

206. Indeed, if the tax were higher than the market price of a permit without such a tax, then the market price for a permit would plummet to zero. I am ignoring distributional considerations here, which could be addressed through a suitable distribution of permits.

207. P. 348.

208. P. 346.

209. P. 37. Vice President Gore glosses over the fact that the most effective solution and the least costly solution may not be the same.

D. *The Two Approaches: Complements or Substitutes?*

I believe a constructive alternative vision can be offered. It is an inclusive vision, acknowledging a wide range of perspectives on complex environmental issues. It is a synthetic vision, melding the strengths of the the visionary and the policy analytic approaches. Finally, it is a pragmatic vision, which would portray politics realistically when designing policies to enhance our quality of life.

In a sense, the policy analytic approach and the visionary approach can be viewed as complements. The visionary approach aims primarily to help reshape attitudes toward saving the earth. The policy analytic approach aims primarily to highlight the ramifications of achieving a state closer to Nirvana, however defined. The visionary approach may be best viewed as a way to stimulate discussion by playing on our emotions. The policy analytic paradigm can help ground that discussion in reality. In practice, both may be needed to resolve successfully the major challenges that confront humanity.

While the two approaches can complement each other, they differ in important respects. The policy analytic approach is likely to make concepts of sustainability lose much of their luster. Indeed, I suspect that the policy analytic approach will eventually reduce sustainability to a matter of trying to internalize environmental costs and then hoping for the best. That is, we will never be able to be sure that we are on a sustainable path unless the definition or the analysis trivializes the problem. The policy analytic approach makes a serious attempt to link inputs to outputs, an exercise that is sorely lacking in the Vice President's vision. It does not solve the world's problems, but it does help provide a roadmap for concerned decisionmakers.

Both the policy analytic approach and the visionary approach are highly abstract. They represent different perspectives on the universe—one in which analysis guides the making of decisions which help identify further problems for analysis; and a second, in which the time for analysis has come and gone, and the time for action is long overdue. Both abstractions are useful, but limited.

To someone who believes "we already know more than enough"²¹⁰ to act on a variety of global environmental issues, including climate change, the hard-headed criticism contained in this Review Essay must be frustrating. But, and this is key in my opinion, such views should not be omitted from the discussion, as I fear they would be in the massive educational campaign Mr. Gore envisions. Through a judicious dose of analysis combined with common sense, we may have the good fortune to continue enjoying higher standards of living in successive generations, even as we assume the mantle of environmental stewardship.

210. P. 37.

VI. CONCLUSION

Perhaps I have been unfair in my evaluation of this book. Rachel Carson's *Silent Spring* would not have received good grades as an exercise in policy analysis; yet, it would receive a high mark for consciousness raising. So, too, should *Earth in the Balance*. As a wake-up call for environmental activists, this book makes for great reading. And perhaps this is Vice President Gore's mission. As a politician and leader, part of his job is to help provide vision and shape our preferences. But the Vice President goes further. He defines a Global Marshall Plan that would make the original Marshall Plan pale by comparison.

The author sees the environment in black and white terms. For Mr. Gore, "you are either on the bus or you are off the bus."²¹¹ "Adopting a central organizing principle . . . means embarking on an all-out effort to use every policy and program, every law and institution, every treaty and alliance . . . to halt the destruction of the environment and to preserve and nurture our ecological system."²¹² Vice President Gore derides people who do not share his perspective, most notably mainstream economists, scientists who beg to differ with his conclusions, and people who would be hurt by his proposed policies. There is something troubling to me as a policy analyst about all this religious fervor. Most troubling is the apparent unwillingness to consider opposing points of view. This tactic works well in spewing forth sound bites on television. It works less well in devising a grand plan to save the world.

Politicians who seek power can have both visions and delusions; it is the task of the public to tell one from the other. To change the world, Mr. Gore must first convince us that his belief system is more vision than delusion. This book represents the first critical step in that process. In my view, we are unlikely to be persuaded, for several reasons. First and foremost, whether or not the fate of the earth lies in the balance, human nature is not going to change. Consciousness raising was an unmitigated disaster in the communist "experiment" over the last century, and it will continue to fail, at least until genes can be manipulated to change human nature. Second, the changes Mr. Gore is talking about are hardly modest, and thus are likely to meet fierce political resistance. Third, his evidence is vastly overstated. Humanity would hopefully require more evidence before agreeing to such massive changes.

My principal criticism of this book is that it is long on rhetoric and short on policy analysis. It is true there are encouraging signs that politicians are learning to consider new ideas. But in the end Mr. Gore's policy prescriptions do not fit neatly within the economist's framework. Pricing and markets are the exception rather than the rule in the Global Marshall Plan.

211. TOM WOLFE, *THE ELECTRIC KOOL AID ACID TEST* 74 (1968).

212. P. 274.

So if you agree that we are falling off a cliff, this book is the perfect manifesto. But even if you disagree, this book has much to offer. The reality is that we face serious environmental problems at the local, regional, and global levels. The reality is that we are experimenting with our planet on a massive scale.²¹³ We do not know very much about what we are doing to the planet; and while so far we seem to have “muddled through,”²¹⁴ we are not infallible. Mr. Gore sensitizes us to our fallibility.

Vice President Gore correctly points out that we need “a searching reexamination of the ways in which political motives and government policies have helped to create the crisis and now frustrate the solutions we need.”²¹⁵ At present, we have a limited understanding of how different interest groups—including environmentalists, business, politicians, and bureaucrats—affect the evolution of environmental policy. Research that sheds greater light on these issues would be most useful. I would hope the Vice President promotes public support for such research. It is essential that we understand the forces that shape the status quo to determine the ideas that will be needed to move us in a new direction.

The central theme of this book is that we need a new perspective—particularly in thinking about our relationship to the earth. Mr. Gore uses many examples to demonstrate the importance of perspective, but the one that I found most compelling was the story about artists in ancient Peru who drew figures on the ground that could be recognized only from the air.²¹⁶ Looking at things in new ways is one of the trademarks of human intellectual progress.

Over the next century we will be compelled to rethink our relationship to the environment, as well as to one another. The emergence of new technology connects us in ways few could have imagined thirty years ago. The beauty of this book is that it stimulates the reader to take a new perspective. While I do not adhere to Mr. Gore’s vision, I do agree that we need to move toward a new paradigm. I hope politicians and scholars seize upon this vision as a starting point for discussion. Who knows? The future of the earth may lie in the balance.

213. The real question is what kinds of experiments should be allowed, not whether we will do them.

214. Charles E. Lindblom, *The Science of Muddling Through*, 19 PUB. ADMIN. REV. 79 (1959).

215. P. 11.

216. P. 43.