Tackling the Critical Conundrum

How Do Business, Government and Media Balance Economic Growth and a Healthy Environment?

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FOREWORD

Many discussions about the environment become, at some point and to some extent, a discussion about economics – how much environmental protection or restoration will cost, how such costs will affect a company's or a country's growth, how to weigh the costs against the benefits. Elected officials and the news media also have to consider, explicitly or implicitly, how to deal with and explain real or apparent conflicts between the environment and the economy.

To explore these issues from a variety of perspectives, the Aspen Institute invited a small group of business, financial, government, news media, and environmental leaders to an Environment and Economics Forum in January 2004 to discuss how these organizations tackle the sometimes competing values of economic growth and a healthy environment.

We were privileged to have as co-chairs Christine Todd Whitman, former Governor of New Jersey and Administrator of the Environmental Protection Agency, and Frank Loy, former Undersecretary of State for Global Affairs. Their extensive experience and knowledge of a broad range of environmental topics and their ability to frame and focus the issues led to a robust, congenial, and informative dialogue. Their overview of the discussions and their distillation of the group's conclusions are included as the introductory article in this volume. It is an effort to reflect the agreement of the group where it existed, but participants were not asked to agree with its final wording.

Seven discussion papers prepared in advance of the Forum are also included in this volume. Two provided background on the issues of clean air and clean water, in order to ground the dialogue in specific issues, and five explored the environment-economy tradeoffs from the perspectives of a corporation, an investment firm, an elected official, a news executive, and an economist.

The skill of the co-chairs and the authors' informative papers were essential to the success of the Forum, but an equally important element was the expert contributions from all of the participants. The discipline of informed dialogue and

inquiry enhanced the participants' ability to think clearly about complex issues, mindful of the value of differing viewpoints. The sharing of views in a spirit of candor and collegiality helped to expand each individual's understanding and to develop new insights.

Smoothly run meetings do not happen automatically. The efficiency, patience and cheerfulness of Katrin Thomas in handling the administrative arrangements for the meeting and the preparation of this book are gratefully acknowledged. They are no less valued for having been demonstrated on numerous previous occasions.

Finally, the initiative for this Forum and much of the guidance in developing its focus came from Jessica Catto, and her personal commitment to the environment was a continuing source of inspiration. I am grateful for her leadership and support, and for the grant from the Henry and Jessica Catto Foundation that made this project possible.

Sincerely,
John A. Riggs
Executive Director
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A Healthy Environment and Economic Growth: Tradeoffs or Synergies?

Frank Loy and Christine Todd Whitman

One of the enduring debates about environmental issues is the extent to which progress can be achieved without economic harm, either to a business or to society as a whole. The risk of such harm has frequently been used, often effectively, as a reason to oppose or delay actions to reduce pollution or to otherwise advance environmental protection goals. The apparent political persuasiveness of the argument has led to a counterargument: that there are usually win-win solutions and that environmental and economic goals need not be in conflict.

The organizing question for the Aspen Institute Forum convened to consider this "critical conundrum" was "How do business, government and media balance the competing values of economic growth and a healthy environment?"

The premise of the discussion was that dealing with environmental issues poses particular problems for three actors in the American society:

- public officials, who are constantly buffeted by conflicting pressures as they seek to develop and enforce policies that address environmental issues, while remaining mindful of the needs and demands of the business sector and the national economy that would be affected by any environmental policy. These conflicting pressures seem stronger in the U.S. than in most other industrialized countries.

- leaders of business enterprises, who need to balance various desires — to be good citizens, to solve environmental problems, to be forward-looking – with what our society currently considers the overriding task of a CEO – to increase shareholder value in the relatively short or middle term; and

- journalists, who want to report fairly and responsibly on complicated environmental issues while facing time and space constraints as well as conflicting opinions, vigorously promoted, about the science and the economics involved in their stories.

The participants asked two fundamental questions:

- How real are these conflicts? For example, is there really a conflict between enhancing shareholder value and taking steps to reduce a company's polluting emissions?

- What tools do we have to make the task of these actors easier?

The Public Official

When developing or advancing a policy, public officials struggle with three kinds of decisions: how to set the goals they want to achieve; how to achieve these goals in a cost-effective manner; and what processes to use to win political support for their efforts.

Taking these in reverse order, the participants developed a clear consensus that public officials had available procedural techniques or processes that would make their task easier and would reduce most political fallout.

- The first of these is to increase the transparency in their regulatory processes. The participants heard persuasive first-hand stories demonstrating that a transparent process increases the acceptability of a course of action, even by those who don't really agree with it.

- Second, being honest about costs and benefits of policies, and about successes and failures of past policies, is another way to provide citizens with greater confidence in, and reasons for supporting, regulatory measures.

- Last, focusing the regulatory regime on outcomes rather than on process was viewed as a particularly helpful step. Example: the public official who measures the success of his or her local air quality regulations by quantifiable improvements in local air quality rather than by the size and number of fines imposed will have an easier time.

We noted that the thirty-year history of environmental legislation has yielded some impressive success stories. One involves laws and regulations, such as the 1986 law creating the Toxics Release Inventory, that are based on the public's right to know. These can lead to better behavior on the part of businesses concerned about community concerns, more informed advocacy on the part of citizens, and better decision making by public officials.

Generally, however, success requires public officials to go beyond providing data. Various methods are available, including voluntary action (considered desirable but often clearly inadequate), command and control mechanisms, and market-based techniques.

Attention was focused on two laws: The Clean Air Act of 1970, which dramatically improved local and regional air quality, and the Clean Water Act of 1972, a similar success. Both laws employed techniques that, the group agreed, would be much more controversial today.

First is their use of "command and control" techniques. The two laws did not just set standards that industry and others had to meet, but they prescribed what had to be done – for example the emission characteristics or control technologies of new power plants.

Second, both laws used public health standards as the driver, as the determinant of the degree of improvement that had to be achieved. They did not qualify that by adding an economic or cost test.

The group asked to what extent it would be proper and wise for government to apply these techniques today. As to the first of these, there was a consensus that, while we could not and should not eliminate command and control requirements from our menu of public actions, public officials will often have more success when they use techniques that employ market forces. The emission trading

scheme for sulfur dioxide in the 1990 amendments to the Clean Air Act was considered by all as an example of regulatory form that worked.

As to the second, there was consensus that standard setting would and should remain the responsibility of public officials. Making such decisions is what they are elected to do. Failure to do so would mean either a delegation of this responsibility to unelected officials or relying for progress on the industrial sector's setting its own standards and then seeking to meet those standards by voluntary action. Neither was viewed as acceptable. However, when the question was raised to what extent it was appropriate for government, in setting those standards, to take into account economic considerations, finding consensus in the group proved more elusive.

At the heart of the debate was the tool of benefit-cost analysis in determining standards. All agreed that in principle it was simply a tool – albeit a very useful one – that could help in two ways: it could estimate whether the environmental benefits were likely to be sizeable enough to warrant the economic costs involved in complying with the law or regulation, and it could help guide regulations in a direction that would provide the most cost-efficient solutions.

The perceived weaknesses of this tool, particularly when used to set environmental goals, troubled some more than others. It is exceptionally difficult to quantify objectively such costs and benefits as the value of a human life and life expectancy, of life diminished by poor health, of species that might go extinct, of the existence of wilderness, and of benefits or costs occurring far in the future. Benefit-cost analysis also does not generally reveal the distributional inequities that may result from a regulation: the question of exactly who in the population pays and who benefits.

But the heart of the debate about benefit-cost analysis seemed to turn more on philosophical than on practical concerns. When public health is at stake, should we really tailor the degree of improvement to the costs of achieving it and, if so, to what extent?

The discussion dealt both with principle and practicalities. The practical concern was that in the reality of the political arena this would not be as neutral a tool in fact as it is in theory. The incentives to game the system are great, and

often irresistible. (For example, the predictions of the cost of reducing sulfur dioxide emissions that preceded the 1990 Clean Air Act Amendments were uniformly and significantly overestimated, either from an abundance of caution or suspicion, i.e. an unwillingness to count on technology improvements, or from an abundance of political gamesmanship.)

The dominant fear on the part of some participants was that the analysis would be used principally to fight against taking actions that had large public health benefits. This is a particular risk because the costs being measured are often borne by a firm or sector while the benefits are shared by society as a whole. Who would undertake the analysis, and how objectively it would be done, were also matters of concern to some. There was agreement, however, that an open and transparent process could alleviate many of these concerns.

The Corporate Executive

There was considerable sympathy for corporate executives who are caught between the demands of different stakeholders – specifically their obligations to shareholders, with their legitimate concern for share value – and the broader interests of the public.

The question was what drivers – other than government laws and regulations – are likely to yield good corporate environmental conduct. This conduct could come from several sources: a general desire to have the company "do the right thing", which can be personal but can affect the company's reputation and therefore have market value; pressure from foreign countries where the company does business; pressure from socially-minded shareholders; a personal desire by the CEO to be a member of a progressive group of leaders.

A perhaps surprising conclusion of the group was that treating the corporation as a "moral actor", as one might a natural person, is not a useful way to approach the problem.

There are probably only few instances where corporations are justified in incurring major expenses when not required to by law. Environmental leadership can, of course, contribute to financial results by enhancing the company's reputation among consumers, and also among investors who see good environmental

performance as a proxy for overall good management. There are obviously also instances where a change in the way a business operates would simultaneously yield an environmental benefit and improve the bottom line over a reasonable period. Often business executives, by reason of their background and relatively short tenure, are not able to see or willing to take advantage of these opportunities. That does not help, however, with the more frequent reality – that this coincidence of interests is often not to be found. The root of this larger problem is that generally the costs of environmental harms accrue to society as a whole and not directly to the firm, and therefore the executive's freedom to expend company monies to deal with them is quite limited. Only government action can solve this dilemma.

Such government action need not be inconsistent with the reliance on efficient market tools that most participants considered desirable. Getting the respective roles for government and the private sector right is crucial. Government should – indeed must – set the standards on behalf of society, the standards that all competitors must meet. Corporations should then be left relatively free to find the most efficient way to meet the standards. This clarity of roles should minimize the confusing and generally unrealistic expectation that corporations will voluntarily spend shareholders' money to achieve environmental improvements that society desires but has not required.

However, even in the absence of such mandatory standards, executives have some room for maneuver. One need only look at the different behavior of companies in the same business, such as the oil industry. One such area lies not so much in taking actions within the company beyond those required, but rather in the external positions the company takes on public policy questions. Here the company's aims need not differ from the public's. The group believed that, in order to be environmental leaders, executives need several things.

- A level playing field – no advantage to their competitors through regulations;
- Predictability – needed to raise capital for the business;
- Minimizing the "stroke of the pen" risk – a law or regulation or international treaty that suddenly changes the rules that govern the business and could, for example, make some sunk investments redundant or useless; and

- Help in their public relations – executives and their firms need to be rewarded with favorable comment for appropriate action.

When government acts in a way that takes into account these needs of the business community, progress should be more achievable.

There was unanimous agreement that if a company did voluntarily take steps in advance of any legal requirement, such early action needed to be recognized and rewarded.

However, perhaps a more effective stimulus to environmentally positive actions involves risk analysis and minimization. One participant noted the "stroke of the pen" risk would cause a forward looking executive to take steps in advance of such event. The possibility or likelihood of the entry into force of an international agreement (the Kyoto Protocol or otherwise) or a national law that puts a price on carbon emissions has shaped a number of business decisions that seek to reduce a firm's carbon emissions.

The group considered whether pressure from investors could affect corporate environmental behavior. There is a clear and growing body of socially responsible investors who are committed to the notion that environmental criteria must be fundamentally integrated into the analysis of a company for possible inclusion in a portfolio. But how powerful is this development?

On balance, the group felt that these investors constituted a meaningful source of pressure for bringing about corporate environmental change, but are not yet a very strong source. There is evidence that attention to environmental performance can be translated to superior market performance. The evidence here, however, is anecdotal and not universally recognized. If that nexus could be established more persuasively, the investor would become a stronger instrument of change.

One point that was somewhat clearer was that investors will pay a premium for information; a corporation that discloses more fully will command a higher stock price. This should lead over time to greater inclusion in financial reports of hidden liabilities (e.g. the disposal costs of dirty circuit boards). Additionally, it

appears that some shareholders use evaluation of the way a company handles environmental concerns as a proxy for evaluating management more generally.

The Journalist

Publishers, editors, news directors and reporters face quite different pressures, as they seek to cover environmental stories.

- First, the market demands are real and growing – pressure to write stories that readers will want to read rather than those that are necessarily important.

- The issues to be covered are proliferating, they are becoming more and more complex, and they have long time horizons.

- The journalist covering these complex stories gets "help" – and needs help – from numerous sources, such as the government agencies in charge, corporate public affairs offices, environmental NGOs, and scientists of all kinds. However, all often have very specific axes to grind, and the burden of sorting through these inputs is substantial.

The journalists' task is made tougher because, while we expect them to be objective, we place on them two special burdens that require them to make difficult and quite subjective decisions. First, we expect them to distinguish between the truly important and the routine story. Second, we expect them not merely to "report" but rather to synthesize a whole array of facts and views, rendering these complex issues more understandable to us.

The problem of conflicting scientific views presents a particularly sharp dilemma. On the one hand, there is an obligation to record conflicting scientific views when there is a valid scientific basis for that conflict. However, in doing so, the readers could be quite misled into believing that the differences are deep and somewhat evenly divided, when that may not at all be the case. This requires the journalist to distinguish between differing levels of scientific analysis.

The participants believed that, when there are conflicting scientific views, a diligent journalist needed to ask several questions:

- Is this an instance of a broad consensus of views versus some outlying views?

- Have the various positions undergone similar rigorous reviews – such as peer review in a credible journal?

- Is the independence of the scientists in question clear? Do any of them have financial ties to a party that has a stake in the outcome?

The group felt that editors and news directors, those who make long-term resource allocation decisions for the news media, need to be challenged to devote adequate resources to environmental issues and to insist that professional reporting adapt to reflect the importance and complexity of these issues.

Tradeoffs or Synergies?

On balance – a word used often during the Forum – the participants agreed that tradeoffs between economic growth and environmental protection can be real. Scarce economic resources must be used to tackle many environmental challenges, both at the level of the firm and of society. And while such expenditures may contribute economically through job creation, the advancement of technology, and international competitiveness, the same resources cannot be spent on other business or social priorities.

At the same time, there may be more win-win situations than have been discovered or acknowledged. In particular, avoiding the short-term time horizon that currently forces many corporate leaders, investors, and elected officials to weight short-term costs more heavily than long-term benefits may disclose many more instances of environmental improvements that have an economic benefit. The values of human health and natural resources, only sporadically and inadequately considered in many economic decisions and national accounts, need always to be included.

Environmental decisions will grow in importance in the future, especially as we face global problems that require long-term solutions. Business leaders, elected officials, investors and journalists will all be called on to evaluate the economic impact of action as well as inaction.

To help make these decisions wisely, we will need several things:

- a public better educated in both environment and economics,
- a commitment to transparent public processes and honest political debate,
- the use of cost-effective tools, and
- the acceptance of the importance of both environmental and economic values.

These are difficult but not impossible goals. The participants in the Forum agreed that a commitment by business, government, journalists, and individual citizens to achieve them is critical to our future and quality of life.

Today's Healthy Air Choice: Addressing Key Elements of the Approach to Air Quality

Carol Browner and Gary S. Guzy

In 2003 the United States Environmental Protection Agency (EPA) issued an assessment of the state of the nation's environment, including assessing air quality. The upshot of this report was that air quality has improved markedly – even during a period when economic activity has grown dramatically. These results are attributable to a comprehensive legislative and regulatory framework that pervades almost all elements of the economy and represents an intensive coordinated state and federal effort.

EPA's report confirmed what we all know intuitively – that the nation's air is much cleaner today than it was thirty years ago. Total emissions of the six principal air pollutants, for instance, have decreased by nearly twenty-five percent during this period. Air toxics – linked to health effects such as cancer – and sulfate deposition – a major component of acid rain – have also declined. EPA's assessment noted that this progress has occurred even while – during the same thirty-year period – the U.S. Gross Domestic Product increased 161 percent, energy consumption increased forty two percent, and vehicle miles traveled increased 149 percent.

Notwithstanding this progress, EPA acknowledged in its recent report that significant challenges remain in attaining health-based standards for ozone and particulate matter, in improving visibility, and in understanding the nature and magnitude of issues posed by indoor air pollution. Just one fact in this regard is striking: more than 133 million people live in areas where monitored air quality in 2001 was unhealthy at times because of high levels of at least one criteria air pollutant.

These circumstances and statistics raise a central question. What are the implications of this experience for continuing air quality challenges? On one side are those who would use EPA's snapshot as proof that the air is getting cleaner and that current approaches can be relaxed and future challenges largely ignored. Others see the report as an indication that significant air quality challenges remain and that the current approaches provide an appropriate framework for continuing to address them.

This paper examines the sweeping change represented by modern clean air legislation that allowed us to arrive at this intersection, the great American success story that has been our Clean Air Act, some of the future policy challenges to be resolved, and what we can learn from the path our nation has taken in addressing these issues to date.

Toward Comprehensive Air Pollution Regulation

Modern environmental protection was propelled by a series of crises that galvanized public and political consciousness. In October of 1948, a climatic inversion in Donora, Pennsylvania, did not allow emissions from zinc and steel works to escape from the Monongohela River Valley, leading to a thick stew of air pollution that darkened the daytime skies. This inversion lasted five days, causing twenty deaths and sickening half of the town's population of 14,000. It was echoed by similar incidents in Los Angeles and London. These events led to a new public recognition that the health effects of air pollution episodes could be severe and immediate, and they propelled governmental investigations of the resulting deaths. Rachel Carson's Silent Spring, published as a series in The New Yorker in 1962, had a similar widespread impact in demonstrating the power and immediacy of environmental threats. By the time protestors took to the streets surrounding the first Earth Day in 1970, an aggressive federal governmental response was being formulated.

Governments at all levels responded to these concerns. By 1955, the Federal Government passed its first legislation addressing these issues, authorizing research. In 1963, Congress directed the Secretary of Health, Education, and Welfare to compile and publish air quality "criteria" based on scientific studies – essentially guidance to states on protective health levels of air pollutants. In 1967, Congress directed States to develop regionally based air quality standards. It also required them to regulate certain categories of existing stationary industrial sources of emissions.

Congress, however, grew increasingly dissatisfied with the absence of progress in these state-based approaches. The 1970 Clean Air Act represented a significant shift in approach, with Congress providing for federally-established national ambient air quality standards for the most significant pollutants and requiring that states prepare, and submit for federal approval, implementation plans setting forth how they would meet these standards. Congress required states to meet these standards within three years of plan approval. While the Clean Air Act establishes national air quality standards, it still leaves the selection among appropriate and necessary emissions reductions to the states, so long as they meet these standards.

In addition, the 1970 Act imposed a series of new and innovative federal standards that states could employ in meeting these tasks. For example, the Act required that automobiles achieve 90 percent reductions in major pollutants within a short period and imposed modest controls on sulfur dioxide from coal fired power plants. EPA aggressively implemented these new requirements, moving forward with actions such as its first state plan approvals in 1971 and the addition of a lead national ambient air quality standard in 1976.

Congress again tightened these approaches in 1977, by requiring that the national standards be reviewed every five years, to ensure that they reflected the most current science. Congress also added new attainment dates and developed the concept that already clean areas not backslide out of attainment, with resulting sanctions for States. In addition, Congress effectively required that scrubbers be installed on new coal-fired power plants. This provision was endorsed by Eastern coal producers and miners in an unusual alliance designed to prevent a preference that had developed for lower-sulfur Western coal as the means for compliance.

In 1990, Congress greatly expanded the Clean Air Act and adopted a similarly aggressive tone. Among the changes were: establishing a program and timeframes for areas to reach attainment with air quality standards, by classifying the severity of the non-attainment; strengthening the federal automobile emissions and clean fuel requirements to reduce the pollution contribution of this significant sector; creating a new program to require significant emissions controls for major air toxics; requiring power plants to slash their emissions of acid rain-causing gases by nearly half; providing tools for addressing the interstate transport of air

pollutants; establishing a consolidated operating permit program for sources of air pollution; addressing the phase out of ozone-depleting chemicals; and reducing visibility impacts on parks and other areas.

The acid rain provisions are particularly interesting, because opposition to their adoption was tempered by the injection of market-based trading principles for compliance. Thus, rather than simply requiring companies to install particular technologies, the Amendments set up a "cap and trade program" – allowing for the trading of emissions reductions. This approach permits those who could most efficiently reduce their pollution to market these reductions to those for whom reducing emissions would be more costly, thus helping to minimize the costs of compliance for all companies. It also highlights increasing experience with setting "performance-based" – as opposed to "process-based" – standards.

Fundamental Public Health Approaches to Air Quality Protection

Our nation's approach to confronting its air pollution challenges has been well served by three bedrock principles inherent in these regulatory developments. These are:

- A focus on "public health" as the primary animator of this policy, expressed in moral terms of the absence of a right to pollute, even where significant economic consequences may result;
- An appreciation for the need to carry on with these public health protections, even in the face of inevitable scientific uncertainty; and
- A recognition of the importance of "technology-forcing" as the way to focus American industrial creativity on addressing pollution problems.

The Clean Air Act, beginning in 1970, was designed to effect nothing short of a radical change in American society. The Supreme Court has said the Act was intended to be a "drastic remedy to . . . a serious and otherwise uncheckable problem" by "sharply increasing federal authority." Federal primary national ambient air quality standards are – in the words of the 1977 Clean Air Act Amendments – to be set at "the level that 'protects the public health' with an 'adequate margin of safety,' without regard to the economic or technical feasibility of attainment" (emphasis added). Secondary national ambient air quality standards are to protect human welfare.

Beginning with EPA's first Administrator, William Ruckelshaus, those carrying out the law have understood that its focus needed to be on protecting the most sensitive members of our society – such as the elderly and the sick – erring "on the side of public health." EPA Press Release (April 30, 1971). Congress' early rhetoric focusing on public health as the driver for protections – without regard to cost or technological feasibility – was striking and might surprise most listeners today:

The [Senate] Committee [on Public Works] determined that 1) the health of people is more important than the question of whether the early achievement of ambient air quality standards protective of health is technically feasible . . . . Therefore, the Committee determined that existing sources of pollutants either should meet the standard of the law or be closed down (emphasis added).

This understanding of the transformative nature of the Clean Air Act's aspirations was confirmed by a unanimous Supreme Court in its 2001 American Trucking Association decision, after reviewing this thirty year history. In challenges brought by industry to the tougher soot and smog standards adopted by the Clinton Administration, the Court definitively laid to rest these arguments and agreed with EPA that ambient air quality standards must be set at a level "requisite to protect public health," without the consideration of cost and technological practicality. While States may consider costs in the mix of control measures they select for achieving air quality standards, costs cannot dilute the public health goals themselves. As Senator Muskie originally stated, "the concept is of public health, and the standards are uncompromisable in that connection" (emphasis added).

Congress also understood that EPA may not have every scientific answer in making these decisions. In the 1977 Amendments to the Clean Air Act, it required EPA to set national ambient air quality standards ("NAAQS") and to review their scientific adequacy every five years. EPA Administrators have understood as well that public health-based decisions must be made even in the face of this expected uncertainty. Administrator Ruckelshaus, in announcing the very first NAAQS set by EPA during the Nixon Administration, did not flinch due to such circumstances:

These are tough standards. They are based on investigations conducted at the outer limits of our capability to measure a connection between levels of pollution

and effects on man. In the case of carbon monoxide, one of the most important pollutants, we have set a standard to protect against effects reported by investigations which prompt arguments even among our own scientists. In the case of photochemical oxidants, also largely contributed by automobiles, our standards approach levels that occur fairly commonly in nature. EPA Press Release (April 30, 1971)(emphasis added).

Former EPA Administrator Christine Todd Whitman likewise has noted, in a speech to the National Academy of Sciences, that, "the absence of certainty is not an excuse to do nothing. . . . Environmental policy should always be based on the soundest information available at the time."

Was a scheme that focuses only on public health consequences and that pushes the frontiers of science rooted in irrationality and destined for failure? The key bridge to ensure its success has been the concept of technology-forcing. Senator Edmund Muskie, the primary sponsor of the 1970 amendments to the Act, introduced them by saying that Congress' central responsibility in drafting the Act was not "to be limited by what is or appears to be technologically or economically feasible," even if that means that "industries will be asked to do what seems to be impossible at the present time ." Our clean air legislation has recognized that, at critical junctures, many in industry have needed to have their attention, energy, and resources focused on achieving pollution reductions, for otherwise there would be little or no incentive for public health and environmental improvements where environmental effects are purely external costs. Congress recognized that setting public health standards would provide an incentive for affected businesses to develop innovative and cost-effective control strategies during implementation of those standards.

Even the Supreme Court in its 2001 American Trucking considerations recognized the essential role played by technology forcing. Justice Stephen Breyer explained:

To read this legislative history as meaning what it says does not impute to Congress an irrational intent. Technology-forcing hopes can prove realistic. Those persons, for example, who opposed the 1970 Act's insistence on a 90% reduction in auto emission pollutants, on the ground of excessive cost, saw the development of catalytic converter technology that helped achieve substantial reductions without the economic catastrophe that some had feared (referring to

statements that automobile emissions standards could "force [the automobile] industry out of existence" because costs "would not be taken into account").

A recent study conducted by the Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA) – an institution perhaps best known for its anti-regulatory sentiments – found that Clean Air Act requirements have yielded enormous economic benefits. OIRA found that major federal regulations resulted in between135 billion dollars and 218 billion dollars in annual benefits while they imposed from thirty eight to forty four billion dollars in annual costs. OIRA acknowledged that the Clean Air program "accounts for the majority of the national benefits." These findings are consistent with studies that show that initial estimates of regulatory costs routinely exceed actual costs by between thirty and 100 percent.

Continuing Public Health and Environmental Challenges

Today our nation faces significant continuing public health and environmental challenges from air pollution. Some of the key problems we continue to confront are:

- Large areas of the country meet neither the old ozone standard nor the tougher new Clinton-era eight hour ozone and fine particulate matter standards, exposing Americans to unhealthy levels of air pollution;
- Many eastern and mid-Atlantic states will be unable to meet these standards without addressing the interstate transport of pollutants from upwind power plants and other sources;
- More than forty states have health advisories restricting the consumption of fish contaminated with mercury, which stems in significant measure from air deposition from coal-fired power plants;
- Many coal-fired power plants – a significant source of the worst pollutants – remain "grandfathered" under the current Administration's revisions to the New Source Review modification requirements;
- Many urban areas exhibit very high levels of multiple and cumulative air toxics that may raise significant cancer concerns, and emissions from diesel fleets will remain a significant contributor for several decades as older heavily-polluting diesel trucks and buses are very durable;
- Asthma plagues six million children and is the leading cause of childhood

hospitalizations and missed school days and – while its causes are not fully understood – it is, at a minimum, exacerbated by air pollution;
- Acid rain continues to plague lakes, rivers, and forests and will require significant additional reductions of sulfur dioxide emissions; and
- Emissions of greenhouse gases and human-induced increases in the concentration of carbon dioxide in the global atmosphere continue to increase.

In approaching these challenges, the critical question should be whether there is any reason to divert from the proven approaches of the past thirty years. The reason to adhere to these approaches is not a general antipathy to any change from the familiar; rather, it is that our nation's legislative and regulatory approach to providing clean and healthy air has been a resounding American success story. This approach has provided substantial health and economic benefits. Yet its future application will depend upon: a willingness to continue to address challenges based upon cutting-edge science that may not always be beyond any question; an unwavering focus on the protection of public health; and the creation of sufficient incentives for American businesses to focus their innovation on providing solutions to pollution challenges.

The current debate over global climate change provides a microcosm of these choices. Does the Administration's current approach depart from this successful history by: insisting on an unprecedented level of scientific certainty; placing public health and environmental outcomes subservient to potential economic scenarios; and elevating voluntary programs over mandates that force businesses to develop new technologies? In so doing, does the Administration create a self-fulfilling prophecy for those who argue that addressing climate will devastate our economy, because the incentive for the development of workable solutions has remained absent? Is this approach rooted in an unduly short-term view of the economic impacts, and one that ignores the success demonstrated by American industry – when compelled to do so – in being fully capable of devising cost-effective environmental solutions? Has the Administration so down-played this issue – even omitting it from EPA's recent comprehensive assessment of the state of the nation's environment, which was discussed at the beginning of this paper – that informed public debate and public policy are shortchanged? Such questions are equally imperative for the range of air quality challenges that remain to be tackled.

Clean Water for Posterity and Prosperity

Mark Van Putten

"*When the well's dry, we know the worth of water.*"

— Benjamin Franklin

Thirty years after enactment of the Clean Water Act, the U.S. has made significant progress in cleaning up America's lakes and streams. Yet, serious challenges remain in managing the nation's water quality and quantity and, at the same time, we face a global water crisis of staggering proportions. Although highlighted by thoughtful publications as diverse as *Nature* and *The Economist*, this crisis has not been effectively communicated to the general public. It was the focus of last year's Third World Water Forum in Kyoto, Japan, and a primary topic of discussion at the 2002 World Summit on Sustainable Development in Johannesburg, South Africa, yet it hardly registers on the U.S. government's policy agenda. Its global scope and significance was outlined in an historic United Nations report, *Water for People, Water for Life*, published last year through the combined efforts of 23 UN agencies and secretariats, yet this compelling call to action has not been matched by deeds.

Confronting this crisis will call upon the combined talents and capacities of governments, businesses, civil society and the media. With stakes so high there are no "competing values," only complementary interests in solving this crisis in the most effective and cost-effective way. And the first step is to free ourselves from the archaic and confounding rhetoric of current discourse about

environmental policy: the positing of false choices between the health of our economy and the health of our environment.

Water: Necessity of Life

There is no more water on Earth now than there was 2,000 years ago, yet our population and consumption rates have grown dramatically. Humans already use 54% of all accessible freshwater, with usage projected to increase to 70% by 2025. Meeting projected human water needs was the focus of "The International Year of Freshwater" in 2003, which received distressingly little attention in mainstream mass media. Last March, the Third World Water Forum marshaled compelling evidence of the human suffering caused by inadequate water supply and sanitation. Millions of people die prematurely every year because of lack of access to clean water; by 2050 seven billion people in sixty countries will have inadequate water supplies (without accounting for a 20% increase in water scarcity predicted by the UN due to global warming). The Forum followed the 2002 World Summit on Sustainable Development, at which governments were supposed to develop concrete plans to achieve the Millennium Goal of halving the proportion of people without safe drinking water by 2015.

U.S. interests in global security and sustainable development require an effective commitment to addressing the global water crisis. But, the U.S. faces daunting domestic challenges as well, both in supplying adequate water to meet projected future demand and in improved efforts to reduce pollution. As noted by the U.S. Environmental Protection Agency (EPA) in November 2003, "[t]his country faces both water infrastructure and water supply problems. The gap between needs and investments for water and wastewater infrastructure could potentially be $224 billion over the next 20 years. Just as important, 36 states expect to experience water shortages over the next ten years, even without drought conditions."

The Clean Water Act: Progress and Prospects

The days of burning rivers and dumping of untreated sewage and industrial waste are largely behind us, thanks to the 1972 Clean Water Act (CWA). This landmark environmental legislation set federal pollution control requirements based on what was determined technologically and economically achievable to

rid our nation's lakes, rivers and coastal waters of obvious pollution. The Act also authorized massive federal funding of municipal treatment facilities as part of its ambitious goal "to restore and maintain the chemical, physical, and biological integrity of the nation's waters."

Despite remarkable progress in improving water quality, this goal of the CWA still eludes us. Currently, only 66 percent of U.S. lakes and rivers pass the Act's basic requirement that all waters should be safe for fishing and swimming, and most Americans live within 10 miles of unsafely polluted waters. Much of the progress that has been realized resulted from dramatic reductions in pollution from industrial "point source" discharges such as factory waste pipes and from untreated municipal sewage effluent. Since the federally-mandated controls on industrial pollution were "technology-forcing," they resulted in more effective raw materials usage, improved efficiencies in manufacturing processes and, in many instances, cost savings. The economy-versus-the environment is not only a false paradigm for the future, but is also – in many instances – a false descriptor of past experience.

Curbing these direct discharges to lakes and rivers by industries and cities was the easy part of meeting CWA goals. Now, we face the challenge of dealing with so-called "non-point pollution," such as agricultural and urban runoff. The annual "dead zone" in the Gulf of Mexico and the decline of the once-thriving Chesapeake Bay fishery dramatically illustrate the scale of the problem.

Every summer in the Gulf of Mexico, severely depleted levels of oxygen in the Gulf's waters produce a condition known as hypoxia, which kills oxygen-dependent sea creatures within its approximate 8,500 square mile zone. While the dead zone varies in size, it has been growing steadily for a decade. As a direct result, oxygen levels routinely fall below a level that most marine life cannot survive, including commercial fish, crab and shrimp species. Its primary cause is excess nitrogen and phosphorous that runs off of Midwestern agricultural lands and is washed into the Gulf by the Mississippi River.

In the Chesapeake Bay watershed excess nitrogen and pollutants are destroying the blue crab population and other aquatic species, threatening livelihoods and a way of life. Sources include urban and agricultural runoff and effluent from

sewage treatment and industrial plants. Despite some early progress in cleaning up the Bay, water quality is now deteriorating rapidly.

Another continuing source of serious water pollution is air pollution. Air pollutants often end up being washed into lakes and rivers, becoming water pollution. For example, airborne mercury from coal-fired power plants is polluting the Great Lakes and other downwind watersheds to the point where many states warn pregnant women and small children against consuming sport-caught fish from contaminated lakes and rivers. Controlling this "toxic rain" requires aggressive and coordinated implementation and enforcement of the Clean Air Act and the Clean Water Act. Similarly, airborne emissions of nitrogen oxides are a major source of water pollution in the Chesapeake Bay; EPA estimates that one-quarter of the total nitrogen loading to the Bay comes from atmospheric sources.

Finally, biological pollution – the intentional or inadvertent introduction of non-native invasive species – is a serious environmental threat and is costly. Except for habitat loss, non-native species have been identified by the scientific community as the most important threat to biodiversity. According to the federally-mandated Aquatic Nuisances Task Force, at least 4,500 species of foreign origin have established free-living populations in the U.S. For example, thirty-two species of nonindigenous marine organisms have been identified in one small estuary – the South Slough National Estuarine Reserve, in Coos Bay, Oregon – and at least 136 nonindigenous aquatic species have been identified in the Great Lakes. The overall cost to the U.S. economy is estimated in the billons of dollars. For example, major water users from the Great Lakes spend an estimated $30 million annually to control zebra mussel infestations and the U.S. and Canada spend over $12 million a year to control sea lamprey populations in the Great Lakes.

Where Water Meets Land: Wetlands Conservation

The areas where water meets land, known generically as "wetlands," are among the Earth's most biologically rich and ecologically significant ecosystems. Wetlands play critical roles as natural water filters, as flood retention areas, as critical spawning habitat for commercially-valuable fish species, as nesting grounds for waterfowl and as home to a diverse array of wildlife species. Yet, these important ecosystems have been drastically affected by ill-advised development patterns, with less than half of the United States' historic wetlands remaining.

Existing CWA protection of wetlands is based on an awkward collaboration between three federal agencies – the EPA, the Fish & Wildlife Service and the U.S. Army Corps of Engineers, which actually administers the wetlands "dredge-and fill" permit program. This program has been ineffective in curbing wetlands destruction to meet President George H.W. Bush's "no net loss" mandate. And, recent administrative changes by EPA would narrow significantly the scope of the CWA program, leaving unprotected up to one-fifth of America's remaining wetlands.

Water Quality and Quantity

The relationship between water quality and quantity is increasingly obvious as our ever-growing populace draws down finite water supplies. Consequences include increased non-point pollution (including nutrients, sedimentation and saltwater intrusion) and altered instream flows. The recent brinksmanship between the U.S. government and California over re-allocating water from the Colorado River illustrates the political complexity of meeting increasing urban water needs at the expense of agricultural interests.

Unwise, shortsighted water diversion, water overuse and water misuse are also major problems in supposed water-rich areas of the U.S. For example, despite their apparent vastness, the Great Lakes are vulnerable to pollution and to overuse. The Great Lakes region is already experiencing water shortages because of poorly planned urban sprawl and lower lake levels that may result from global warming. New water management approaches are being developed through interstate implementation of a new annex to the federally-approved 1986 compact among the Great Lakes states.

Similarly, "water wars" have flared among southeastern states over inadequate supplies for a growing population. Contentious negotiations between Georgia, Alabama and Florida have threatened the adequacy of future water supplies for Atlanta and other growing urban areas and have put at risk the unique and rich biological diversity of mollusks found in the Apalachicola-Chattahoochee-Flint ecosystem. Although last summer's Memorandum of Agreement between the three states was a positive development, many challenges remain in effectively managing the Southeast's diminishing freshwater supplies.

Overlaying these regional examples of historically mismanaged water resources is the history and current reality of the U.S. Army Corps of Engineer's civil works program. Recent investigations by the General Accounting Office, the Inspector General of the U.S. Army, the National Academy of Sciences, the *Washington Post*, and public interest groups have criticized the Corps' biased decision making process and the fiscally unsound and environmentally destructive projects that result. These projects include some of the most notorious examples of "pork barrel" politics such as the $165 million Yazoo Pump Project in Mississippi and the $100 million Devils Lake project in North Dakota. Estimates of the backlog of authorized Corps projects for which Congress has yet to provide funding run as high as $30 billion. So far, bi-partisan efforts in Congress to defund the worst projects and reform the Corps' decision-making process have failed in the face of opposition from the "iron triangle" of local development interests, powerful congressional benefactors, and the institutional bias of the Corps' district offices.

Thinking Like a River: Developing a "Water Ethic"

More than half a century ago, noted scientist, conservationist and author Aldo Leopold called for the development of a "land ethic." The prerequisite to understanding our relationship to land – or, our environment – according to Leopold was to "quit thinking about decent land-use as solely an economic problem." He wrote: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." A proper relationship with land requires a longer-term view than usually comprehended by market-based pricing schemes. It requires, said Leopold, "thinking like a mountain."

So, too, sound water management requires "thinking like a river." It demands an integrated approach to water management, recognizing the connection between wetlands conservation and water quality; between land management practices – especially in floodplains – and water quantity; between assuring adequate flows in environmentally sensitive headwaters streams and water quality in mainstem rivers. While the rhetoric of "watershed management" gains currency, the reality remains a fragmented approach.

More fundamental, however, than the structure of management regimes is the recognition that water is more than merely a commodity. The answer to the impending water crisis is ethical, as well as economic. It requires understanding the essential role of water in meeting basic human needs and in sustaining healthy ecosystems. As the recent UN Report on the global water crisis observed, "water has not only an economic value, but social, religious, cultural and environmental values as well, and [...] these are often interdependent." Similarly, the first of the "Dublin Principles," adopted in 1992 at the International Conference on Water and the Environment, states that "[f]resh water is a finite and vulnerable resource, essential to sustain life, development and the environment...."

Articulating a meaningful water ethic with universal application to water management decisions is a necessary precondition to meeting the global water crisis. This ethical imperative should include the following principles.

1. ***Governments must recognize that water is not merely a commodity and must assure that basic human needs for access to safe water supplies are satisfied.***

Increased attention to the global water crisis has led, among others, the UN Secretary General in his World Water Day statement in 2001 to suggest that access to safe water supplies should be recognized as a universal human right. Embryonic efforts to define this right have resulted in an internationally-recognized basic water requirement of 50 liters per capita per day. This view has widespread support among civil society organizations. In 2001, for example, 800 representatives of groups from 35 countries participated in the "Water for People and Nature" summit in Vancouver, Canada, and issued a manifesto calling for fresh water to be managed as a "global commons." In 2002 environmental and sustainable development groups organized a global "freshwater caucus" to coordinate advocacy efforts at the World Summit on Sustainable Development, and the caucus continues to press governments for demonstrated progress toward meeting the Millennium Goal of halving the proportion of people without safe drinking water by 2015.

Early efforts to privatize water supply systems in developing countries have encountered public opposition, even civil unrest. As noted by *The Economist*, resistance to privatization will continue absent an ongoing role for governments

in assuring affording access to safe water by all. Opponents to bilateral and multilateral trade agreements have raised concerns that water will be treated as a commodity and, thus, government efforts to manage supplies fairly and sustainably will be subject to challenge before trade tribunals. These concerns have been raised specifically concerning the treatment of Great Lakes water as a "good" by the North American Free Trade Agreement; as a result, the Great Lakes governors have reasserted their control of Great Lake water through the "Annex 2000" process.

2. Conservation should be the strategy of first resort in meeting future human needs.

There is no more water to be made. Businessman Paul Hawkens and his co-authors argue persuasively in *Natural Capitalism* that no supply-side strategy can keep up with projected human demands. The only solution is "to increase radically the productivity of water directly and where it's used." Meeting the water needs of people and wildlife requires learning how to make more efficient use of existing water resources.

In this instance, good economics often makes good environmental policy. Honest pricing and eliminating subsidies are among the most effective ways of encouraging water conservation, especially by agriculture which comprises approximately 80% of U.S. consumptive uses. Significant improvements are already underway in the industrial and commercial sectors with water efficiency improving more than twice as fast as energy efficiency. According to Natural Capitalism, water withdrawn per unit of U.S. GNP declined 38 percent from 1980-95. The Economist magazine notes that the steel industry has improved water efficiency ten-fold as measured by the amount of water required to make a ton of steel.

Urban uses also provide significant opportunities for water savings. According to a recent study by National Wildlife Federation hydrologist Dr. Norman Johns, Texas could save as much as 300 billion gallons of water annually if only its major municipalities would plan to use water as efficiently as El Paso and San Antonio. These water savings would avert the need to construct eight additional major dams proposed by Texas' 2002 State Water Plan at an expense of

several billions of dollars. And, of course, water conservation means leaving more water in Texas rivers to sustain healthy coastal estuaries along the Gulf of Mexico.

3. Adequate "instream" flows must be assured to meet environmental requirements for perpetuating healthy populations of dependent indigenous species.

Conservation is not only often the most cost-effective approach to meeting human needs, but it can produce substantial environmental benefits and none too soon. A recent comprehensive study of U.S. freshwater ecosystems by The Heinz Center concluded that approximately one-third of freshwater species are at risk, noting that "[a]bout 20% of more that 4,000 native animal species that depend on streams, lakes, wetlands, or riparian areas are considered 'imperiled' or 'crucially imperiled,' and 4% may already be extinct."

The failure to identify and satisfy the needs for environmental flows has created crises across the U.S., including disputes about salmon in the Columbia/Snake and Klamath rivers in the Pacific Northwest, sturgeon in the Missouri River, whooping cranes dependent on the Platte River in the Midwest, the silvery minnow in the Rio Grande River, and four endangered mussels in the Apalachicola-Chattahoochee-Flint Basin – to name just a few of the most publicized confrontations. Thoughtful planning to identify and assure minimum environmental flows could avoid such confrontations.

Significant environmental costs of proposed water projects should be calculated and considered in the planning process. Typically, they have been ignored or undervalued. Critics of the U.S. Army Corps of Engineers' Civil Works program have focused on the failure to properly identify the environmental consequences of proposed projects. Bi-partisan bills requiring the Corps to consider these impacts are pending in Congress and are the centerpiece of a "Greening the Corps" campaign led by the 70-member Corps Reform Network.

4. Water management decisions should be made on a watershed basis.

Watersheds are dynamic ecosystems in which the health of the component parts – groundwater, intermittent headwater streams, wetlands, floodplains, mainstem rivers and estuaries – determine the health of the whole. Water management decisions should be made on a watershed basis with full acknowledge-

ment that adequate supplies of high quality water depend on an integrated understanding of the role of intermittent headwaters, wetlands, floodplains, groundwater and land use practices. Yet, management responsibilities remain fragmented, especially with respect to land-based development in wetlands and floodplains.

There are direct economic consequences of the failure to use watershed-based planning. For example, flood damages in the U.S. exceed $4 billion annually; the direct human benefits of wetlands and floodplains are increasingly obvious and increasingly valuable. True watershed management requires identifying the interconnection between water quality/quantity and land use practices, especially development in wetlands and floodplains.

Recent federal policy initiatives are discouraging in this regard. The EPA has recently issued administrative "guidance" reducing the scope of wetlands protection under the Clean Water Act.. According to EPA's estimates, the changes in this guidance could reduce federal protection of wetlands by up to 20%.

5. ***Restoration of degraded waters and damaged ecosystem should be a fundamental component of water resource planning and management.***

Saving what's left will not be good enough for the future. The damage to aquatic ecosystems worldwide has been significant. The UN estimates that 60 percent of the world's large rivers have already been altered by dams and other structures, with attendant declines in commercial fisheries and devastating impacts on aquatic biodiversity. "Worldwide, of the creatures associated with inland waters, 24 percent of mammals and 12 percent of birds are threatened, as are a third of the 10 percent of fish species studied in detail so far. Inland water biodiversity is widely in decline, mainly from habitat disturbance, which can be taken as evidence of declining ecosystem condition."

Increasingly, water resources management must focus on restoring degraded ecosystems for the benefit of people and wildlife. Hopefully, the $8 billion federal-state partnership to restore the Everglades will inspire similar efforts elsewhere. Already, the "Coast 2050" plan would restore Louisiana's vanishing coastal wetlands and restoration planning has begun in the Chesapeake Bay and Great Lakes regions. Approximately 20% of the Corps of Engineer's budget is classified for environmental restoration and additional funds should be diverted from

environmentally damaging projects to restoring ecosystems. Restoration requirements should also be incorporated into existing permitting programs, as has been proposed in the Great Lakes region. Under the Annex 2000 criteria endorsed by the Great Lakes governors, applicants for permits to use Great Lakes water must demonstrate improvements to the Great Lakes ecosystem.

Conclusion

Within an ethical context and informed by sound science, policy makers must make enlightened water choices that support economic growth *and* provide access to water for people and wildlife. As the UN noted in its report last year, for the most part we have the knowledge and technologies to meet the global water crisis. The missing ingredient is leadership.

> [The water] crisis is one of water governance, essentially caused by the ways in which we mismanage water resources…. In truth it is attitude and behaviour problems that lie at the heart of the crisis. We know most (but not all) of what the problems are and a good deal about where they are. We have knowledge and expertise to begin to tackle them. We have developed excellent concepts, such as equity and sustainability. Yet inertia at leadership level [sic], and a world population not fully aware of the scale of the problem (and in many cases not sufficiently empowered to do much about it) means we fail to take the timely corrective actions and put the concepts to work.

With leadership such as that represented at the Aspen Institute Environment and Economics Forum, we can achieve balanced solutions that will ensure a healthy economy and sustainable flows of clean water in the future for people and wildlife.

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Environmental Protection and Economic Prosperity: Not a Zero-Sum Game

Christine Todd Whitman

One of the most persistent myths about environmental protection is the assertion that protecting our environment and promoting economic prosperity is a zero sum game. For decades, both the business community and environmental activists have often acted as if economic prosperity and environmental protection are mutually exclusive goals. This has had an unfortunate effect on both public discourse and on policy making.

It often seems that businesses will object to any mandate to improve the environmental performance of their operations, claiming it represents a direct threat to their ability to stay in business and provide jobs. At the same time, it seems that many in the environmental community believe that economic growth always comes at the expense of the environment. These two postures have needlessly complicated environmental policy making at every level of government and in many corporate boardrooms.

Elected public officials, who are held accountable by the electorate both for their commitment to the environment and to promoting economic growth, frequently find themselves being pulled to one extreme or the other by interest and advocacy groups that see things only in black and white.

If public officials do not support a heavy-handed regulatory approach to environmental policy, they are portrayed as putting the economic interests of big business over those of the health of the natural world.

Conversely, if they do not show some restraint in the ways in which they seek to impose and enforce environmental regulations, business and economic groups accuse them of putting the interest of "berries and bunnies" ahead of those of American workers and their families.

This political environment makes it difficult for political leaders to integrate environmental and economic goals in sensible, effective ways. Balanced environmental policy rarely excites either environmental groups or business. Some environmentalists have a certain self-interest in portraying conditions as bad and only getting worse. Some businesses, on the other, are inherently distrustful of government regulation. Frequently, they each stake out positions at the extremes, and while it is an overstatement to suggest they advocate either shutting down business or eliminating all regulations, their public rhetoric is often not far removed from those immoderate positions.

Prudent public policy, however, is rarely, if ever, made at the extremes. Responsible public officials know that most public policy issues require the striking of a careful balance between competing issues. Unfortunately, when confronting environmental protection, seeking a balance is often portrayed as an unprincipled sell-out to one side or the other. In fact, focus groups show that "balance" is not a good word to use when talking about the environment as it connotes someone losing and someone else winning. Thus, in a political arena that has increasingly come to reward those who stake out positions at one end of the spectrum or the other, those who seek to strike a balance between legitimate environmental and economic imperatives often find themselves damned by both sides. Environmental protection does require an investment, but one that often can enhance the bottom line of the company involved while providing future benefits for the community as a whole.

Integrating Environmental Protection and Economic Prosperity as a Public Official: One Governor's Experience

When I became governor of New Jersey in January 1994, I confronted this reality head-on. My state was in the midst of a deep recession – unemployment was escalating, the number of business failures was growing, state budget deficits were deepening, and taxes were rising. While the rest of the Northeast was already in recovery, New Jersey was lagging behind. Numerous business leaders told me

that one of the factors limiting their ability to bounce back was aggressive, unreasonable, and punitive environmental enforcement efforts by the state.

Yet, as the most densely populated state in the union, New Jersey needs and has had a long and strong commitment to environmental protection. New Jersey passed the first clean air act in the nation – in 1954. When you live as closely-packed together as New Jerseyans do, in as industrialized a state as New Jersey is, you value strong environmental laws because you live with the results of poor environmental behavior every day. New Jerseyans expect their state government to use all the tools at their disposal to protect their quality of life.

As governor, I was committed to jump-starting New Jersey's economy and turning the state around. Yet, I was also strongly committed to leaving New Jersey's environment cleaner and healthier than I found it.

Although I was not convinced that over-aggressive environmental enforcement was a major drag on the state's economy, it did help create an atmosphere which suggested that New Jersey's state government was hostile to economic growth. While I did not believe that environmental enforcement was single-handedly crippling New Jersey's economic recovery, I was convinced that there was too great an emphasis on regulations and not enough on results.

I was also convinced that environmental regulations that don't produce positive environmental benefits have the unintended consequence of eroding support for all environmental policies, especially among those who are in a strong position to improve environmental performance – business leaders. They provide a disincentive for business leaders to act as stewards of the environment and instead encourage them only to comply with the letter of the law and do nothing else. We needed to change that calculus.

The first step I took was to change the way in which I talked about environmental progress. For decades, public officials have pointed to the numbers of laws they've passed, regulations, they've written, and fees and fines they've collected as the measure of their commitment to the environment. I believe that is a false measure. After all, those efforts are valuable only to the extent that they lead to results – cleaner air, purer water, and better protected land. I directed our Department of Environmental Protection (DEP) to begin publicizing indicators

that showed, clearly and concisely, whether the condition of New Jersey's environment was improving, or not.

To measure progress, we developed indicators such as the number of annual beach closings, the number of acres of shellfish beds open for harvest, the number of days in which air quality was unacceptable, and the number of acres of open space and farmland that were being preserved. Whenever I talked about environmental protection, those were the statistics I cited – not the number of citations we issued and the amount of fines we assessed. It was crucial that we move the debate away from counting the thickness of the environmental law sections of statute books to measuring the actual condition of the environment. The importance of changing the ground of the debate cannot be overstated. Any effort to strike the proper balance between environmental and economic goals will fail in the court of public opinion if the only measure of environmental progress remains focused on regulations, fees, and fines.

Next, we had to change the mind set at the DEP, ending policies that provided greater incentives for punishing people than for encouraging compliance. When I became governor, the DEP's annual operating budget largely depended on the fines and fees it collected – the more they fined, the more they could spend. In my view, it made no sense to give a regulatory agency – any regulatory agency – a fiscal incentive to make life as difficult as possible for those it regulates. This change was designed to replace the pursuit for budget dollars and cents with the pursuit of common sense in enforcement. It also forced the state to publicly express its commitment to the environment by funding the department out of general revenues.

Third, we had to begin changing policies that transformed once-adversarial relationships into partnerships – partnerships built on a shared goal of true progress. In New Jersey, we found some excellent ideas in a country that shared many of our challenges – the Netherlands. The Dutch National Environmental Policy Plan had, at its heart, a commitment to building consensus. It brought everyone to the table – government, business, environmentalists, and the rest of civil society – and set real, measurable goals for the state of that nation's environment. We used the Dutch NEPP as a blueprint in much of what we did.

One of the earliest policy changes we put into place had to do with permitting for air emissions. Under existing regulation, manufacturing facilities had to

seek a separate permit for every aspect of the operation that emitted anything into the environment. This was an expensive, cumbersome, time-consuming process that often kept new, pollution-reducing technology off-line for months while facilities sought the proper permit. We decided it made more sense to work with our manufacturing facilities to set ambitious, overall targets for their entire facility, and issue one facility-wide operating permit. Facility-wide permitting would cut red tape while reducing emissions overall – often at less cost.

This approach garnered a great deal of attention nationwide, as other states sought to learn from our experiment. After several years, we found that the burden that was being placed on our own DEP was considerably more than we expected. It required that we get to know every facet of a business's process in order to help identify ways to reduce their emissions. It was almost as if reducing red tape is itself a zero sum game – if it's cut for business, government must take up the slack. Eventually we shifted our efforts to another, more ambitious program we had developed called the Silver and Gold Track program that brought even greater returns for the increased workload. This incentives-based program for cleaning the air, water, and land provides a fair degree of regulatory flexibility to companies that agree to meet certain environmental goals that exceed regulatory standards. It encourages, not just environmental compliance, but environmental stewardship. It puts the emphasis where it should be – on pollution prevention. In short, it represents the sort of public-private partnership we need to encourage environmental policy and is now part of our national approach.

Of course, the changes we made meant that, over time, we were collecting fewer fees and fines and we were able to redirect enforcement resources other environmental imperatives, including monitoring and partnership building. Predictably, these changes were used as ammunition by political opponents and by environmental groups, who continually cited the decrease in fine collections as evidence that the state was on the verge of an environmental apocalypse, ignoring the good news about the actual condition of the environment.

Those attacks fell short, however, because we were able to point to real environmental progress. For example, during my first four years in office, the number of beach closings dropped from the hundreds annually to just 10. Toxic air emissions to the air, water, and land dropped by 70 percent – outpacing the national decline. The amount of waters opened for shellfish harvesting grew by

16 percent. And we went two years without a single day where we exceeded federal carbon monoxide standards. Had we not, however, worked hard to change the nature of the debate – from measuring process to measuring progress – I would have likely suffered politically for it.

By combining a clear message of one's commitment to measurable improvement in the condition of the environment, with innovative programs designed to build partnerships around shared goals, public officials can tackle long-term environmental goals even in the context of short term electoral imperatives.

Environmental and Economic Integration on the National Stage

This experience in New Jersey guided almost everything I did as administrator of the EPA. From my confirmation hearing forward, I made sure I emphasized, at every opportunity, that my goal at the EPA was "to leave America's air cleaner, its water purer, and its land better protected" – a mantra that bore repeating. I was determined to shift the focus from process to progress. I felt we had made real headway toward that end when the New York Times, in its front-page story on the environmental record of the Bush Administration over the first two years, used that standard to evaluate our record.

One of the first initiatives I launched inside the Agency was the development of a national environmental report card. The result, EPA's Report on the State of the Environment, was issued in June 2003, shortly before I left the Agency. The report showed that in many areas, the previous 30 years of environmental policy had brought measurable improvements to the quality of the Nation's air, water, and land. It also highlighted areas where improvement was still needed. Interestingly, though, environmental groups rushed to condemn our report, even before they had time to read it. It puzzled me that rather than take credit for the positive results their own efforts had helped produce, they chose instead to attack us for trying to evaluate whether the Nation's environmental policies had worked. It was back to winners and losers: if the environment had improved then that would be an excuse to stop all further efforts.

One of the keys to finding the proper balance between environmental policy and economic prosperity is increasing the awareness that in promoting responsible environmental stewardship government should look to two types of incentives – both negative and positive. It is important that government have a big stick with

which to punish those who violate the laws. But that does not mean that there is no place for a carrot – positive incentives that recognize and reward true environmental stewardship. This is where voluntary programs can also make an important contribution to environmental protection.

The two best examples are EPA's Energy Star program and its Climate Leaders program. Energy Star, which has, for more than a decade, encouraged manufacturers to develop and produce energy efficient products, has not only helped reduce energy consumption, it has helped prevent the pollution that would have been generated had those energy savings not been found. These programs are also demonstrating that what's good for the environment can also be good for the bottom line.

In 2003 alone, Energy Star products helped Americans save more than $9 billion on their energy bills, while reducing greenhouse gas emissions equivalent to taking 18 million cars off the road. Today, more than 1,250 manufacturers produce more than 18,000 different Energy Star products. Since the program began, American consumers have purchased more than one billion Energy Star products. Companies participate, not just to be good corporate citizens (although that is a factor), but also because being able to sport the Energy Star label helps positively differentiate their products in the marketplace.

Climate Leaders, which we launched at the EPA in 2002, is designed to encourage businesses to reduce their emissions of greenhouse gases by setting ambitious voluntary targets in return for assistance from EPA in inventorying their emissions and public recognition from the Agency for their leadership in helping reduce the nation's greenhouse gas emissions. To date, more than 50 of America's leading corporations have signed on as Climate Leaders. EPA expects that the actions the Climate Leaders have pledged to take will reduce carbon dioxide emissions by at least 125 billion pounds a year – equivalent to taking 3 million cars off the road.

Both Energy Star and Climate Leaders succeed because smart business leaders know that there is broad support among the general public for environmental protection and that people will favorably view those companies that can show a proven commitment to environmental stewardship.

Of course, voluntary efforts, while necessary, are not sufficient. For every company that acts in its enlightened self-interest when it comes to its environmental practices – either by enlisting in productive partnerships or undertaking voluntary efforts – there are others who lack the wisdom and foresight to voluntarily improve their environmental behavior. For them, tough regulations, strictly enforced, are necessary. Knowing that government standards are in place or are coming can encourage and facilitate a business's decision to invest in environmental technology or programs.

And, I believe when it comes to enforcement, the states are generally best positioned to enforce the nation's environmental rules. Each year, the states perform about 95 percent of the Nation's environmental compliance inspections and take about 90 percent of the enforcement actions. Those states that have the capacity and the resources to enforce the laws should be encouraged to do so. But because there are situations that are either beyond the ability of any one state to enforce or outside the inclination or expertise of a state, the federal government must maintain a robust commitment to enforcement. National environmental standards should not be applied inconsistently from state to state because some states lack the will or the ability to effectively promote compliance and enforce the law.

The Future of a Balanced Approach

In 1970, at the dawn of the current environmental age, the role of government was, of necessity, much more heavy-handed in its regulatory approach to environmental protection than is necessary today. Businesses had, since the early days of the industrial revolution, paid little if any attention to the impact their practices were having on the environment. The risks to public health from environmental degradation were still barely understood and even less generally accepted. The progressive despoliation of our natural environment had occurred so incrementally that few recognized just how imperiled it was.

But beginning with Earth Day 1970, public attitudes toward the environment began to change rapidly. Within a few short years, virtually all of the major legislation that would govern environmental law for the next 30 years was in place. President Nixon's establishment of the EPA ushered in an explosion of environmental regulations that would vex many businesses but that would also, quite clearly, lead to significant improvements in the condition of our environment and to the adoption of a new environmental ethos.

As people began to see the results of the nation's environmental efforts, they began to evidence a strong degree of support for environmental protection over economic growth. By Earth Day's 15th anniversary, more than 60 percent of those surveyed by the Gallup Poll agreed that environmental protection should be given priority, even at the expense of economic growth. By the 20th anniversary of Earth Day, more than 70 percent of those surveyed held that view.

Yet today, that attitude, as revealed by the Gallup Poll, has changed. Earlier this year, for the first time since Gallup started asking that question in 1984, those who valued environmental protection over economic growth fell below 50 percent, to 47 percent, and those valuing economic growth over the environment hit its highest level ever, at 42 percent. While some might suggest this reflects uncertainty during a time economic sluggishness, that does not appear to be the case. In 1990 and 1991 those who favored environmental protection even at the expense of the economy exceeded 70 percent, dropping briefly to 58 percent in 1992.

Rather, this result suggests that the country, as a whole, is more amenable to the proposition that environmental protection and economic prosperity can and must go hand in hand. Such a shift could have profound consequences for environmental policy making. It could mean that the public is ready to see a more balanced approach to the competing values of economic growth and a healthy environment, this despite the fact that the environmental policy rhetoric has yet to moderate. These results also confirm what I have heard during my travels around the country over the past three years. People understand the need for an integrated approach.

That is why I believe that policy makers must continue to pursue environmental policies in terms of environmental progress instead of bureaucratic process. businesses leaders need to recognize that good environmental stewardship can be good for the bottom line. They need to have the support of their stockholders if they are to make an investment in environmental improvement. If we can use that dreaded word "balance" to talk about maximum environmental improvement in an economically competitive world, we will see real progress in resolving the critical conundrum about which this Forum has been convened.

Environmental Protection and Economic Well-Being: How Does (and How Should) Government Balance These Two Important Values?

*Robert Stavins**

The conference organizers have asked us to "tackle the critical conundrum" – how business, government, and communications media balance the competing values of economic growth and a healthy environment. In a sense, my focus is narrower, because I concentrate exclusively on g*overnment* policy, and ask how government integrates economic concerns into its development of environmental policies. But in another sense, my focus is broader, because I also ask whether and how government *should* carry out such integration of economic and environmental concerns.

In this brief paper, I consider two dimensions of environmental policy, which are closely interrelated but conceptually distinct: (1) what is the appropriate (and actual) *degree* of government activity; and (2) what *form* should (and does) government activity take.[1] In this brief essay, I attempt to define the scope of these questions, and suggest criteria that can be used to evaluate responses.

1. What is the Appropriate Degree of Government Activity in the Environmental Realm?

The fundamental theoretical argument for government activity in the environmental realm is that pollution is a classic example of an externality (an unintended consequence of market decisions, which affects individuals other than the

decision maker). Because firm-level decisions do not take into account full social costs, pollutant emissions tend to be higher than socially optimal levels. As environmental quality is thus naturally under-provided by competitive markets, a possible role arises for government regulation. Private negotiation will not internalize such externalities adequately without government intervention, and exclusive reliance on judicial remedies is insufficient to the task.[2] Hence, since the time of the first Earth Day in 1970, which we may take as the beginning of the modern era of environmental policy, industrialized countries throughout the world have relied mainly upon a combination of legislative and administrative procedures to foster improvements in their natural environments.

If it is appropriate for government to be involved in environmental protection, how intensive should that activity be? In real-world environmental policy, this question becomes, "How stringent should our environmental goals and standards be?" For example, in the United States, should we cut back sulfur dioxide (SO_2) emissions by 10 million tons, or would a 12 million ton reduction be better? In general, how clean is clean enough? How safe is safe enough?

Most economists would argue that economic efficiency – measured as the difference between benefits and costs – ought to be one of the major criteria for evaluating proposed environmental, health, and safety regulations.[3] Because society has limited resources to spend on regulation, benefit-cost analysis can help illuminate the trade-offs involved in making different kinds of social investments. In this regard, it seems irresponsible *not* to conduct such analyses, since they can inform decisions about how scarce resources can be put to the greatest social good. Benefit-cost analysis can also help answer the question of how much regulation is enough. From an efficiency standpoint, the answer to this question is simple – regulate until the incremental benefits from regulation are just offset by the incremental costs. In practice, of course, the problem is much more difficult, in large part because of inherent challenges in measuring marginal benefits and costs. But the fact that we are unable to measure benefits and costs with perfect precision ought not be taken as a compelling argument to abandon such analytical methods altogether, lest we allow the perfect to be the enemy of the good.

Concerns about "fairness" (distributional equity) also merit serious consideration. Regulatory policies inevitably involve winners and losers, even when aggregate benefits exceed aggregate costs. For this reason, assessments of the distributional implications of public policies should be (and in recent years

typically are) carried out, at the same time as assessments of aggregate benefits and costs.[4] Beyond efficiency and distributional equity, non-economic factors – such as those regarding *process* – can also be of key importance. The general view from economics is that other criteria in addition to efficiency can and should be employed by policy makers, but that the existence of such criteria does not invalidate the efficiency criterion, which should remain part of social decision-making.

There is little doubt that a reallocation of expenditures on environmental, health, and safety regulations has the potential to save significant numbers of lives while using fewer resources. As seen in Table 1, the estimated cost per statistical life saved has varied across regulations by a factor of more than a million! Thus, a reallocation of priorities among these same regulations could save many more lives at given cost, or, alternatively, save the same number of lives at much lower cost.

Over the years, policy makers have sent mixed signals regarding the use of benefit-cost analysis in policy evaluation. Congress has passed several statutes to protect health, safety, and the environment that effectively preclude the consideration of benefits and costs in the development of certain regulations, even though other statutes actually require the use of benefit-cost analysis.[5] But this has not prevented regulatory agencies from considering the benefits and costs of their regulatory proposals. Otherwise, what are all those lobbyists doing at EPA headquarters?[6] The problem with such informal, implicit benefit-cost analysis is that it can be unsystematic, not subject to peer review, and carried out behind closed doors, with access limited to the particular friends of the administration. Thus, we ought to be concerned about this approach not only on technical grounds (poor analysis), but on process grounds – it is fundamentally undemocratic.

At the same time as Congress has sent mixed signals regarding the use of economic analysis in environmental policy assessment, Presidents Carter, Reagan, Bush, Clinton, and Bush all introduced formal processes for reviewing economic implications of major environmental, health, and safety regulations (using so-called Regulatory Impact Analysis). Apparently the Executive Branch, charged with designing and implementing regulations, has seen a greater need than the Congress to develop a yardstick against which the efficiency of regulatory proposals can be assessed; benefit-cost analysis has been the yardstick of choice.[7]

Although formal benefit-cost analysis should *not* be viewed as either necessary or sufficient for designing sensible public policy, it can provide an exceptionally

useful framework for consistently organizing disparate information, and in this way, it can greatly improve the process and hence the outcome of policy analysis. If properly done, benefit-cost analysis can be of great help to agencies participating in the development of regulations, and it can likewise be useful in evaluating agency decision making and in shaping statutes.

Despite such arguments, formal benefit-cost analysis has only infrequently been used to help set the stringency of environmental standards. The politics of environmental policy have favored a very different set of approaches to setting standards, such as that embraced by the Clean Air Act: set the standard to "protect the most sensitive member of the population with an adequate margin of safety." Economists and legal scholars have spent a great deal of time arguing that such criteria are neither reasonable nor well defined, but little change has occurred. The significant heterogeneity of costs per life saved under existing statutes, portrayed in Table 1, suggests that in the absence of a benefit-cost test aimed at achieving efficiency, much could be accomplished through greater attention to simple cost-effectiveness, that is, achieving given goals or standards at minimum cost.

In the 104th Congress, a major part of the Republicans' "Contract with America" was a regulatory reform bill that would have made meeting a benefit-cost test a *necessary condition* for a broad set of regulatory actions. That bill was narrowly defeated in the Senate, and would have faced a certain Presidential veto, in any case.[8] Subsequently, Congress considered but did not enact legislation (introduced by former Senator Fred Thompson and Senator Carl Levin) which would have required agencies to conduct (*non-binding*) benefit-cost analyses of new regulations and periodically of existing ones. Congressional efforts at such generic "regulatory reform" are unlikely to disappear from the policy landscape, and there will continue to be attempts – sometimes successful – to introduce benefit-cost tests into individual environmental statutes.[9]

2. What Form Should Government Activity Take in the Environmental Realm?

Once the goals or standards of any given environmental policy are established (whether on political, scientific, economic, ethical, or any other grounds), policy makers are left to ask what *form* should government involvement take. In

other words, what means – what policy instruments – should be used to achieve the established ends? Economists consistently have urged the use of "market-based" instruments – principally pollution taxes and tradeable permits – rather than so-called "command-and-control" instruments, such as design standards, which require the use of particular technologies, or performance standards, which prescribe the maximum amount of pollution that individual sources can emit. At least in theory, market-based instruments are cost effective, that is, they minimize the aggregate cost of achieving a given level of environmental protection, and provide dynamic incentives for the adoption and diffusion of cheaper and better control technologies. Despite these advantages, however, market-based instruments have been used far less frequently than command-and-control standards.[10]

Gradually, the political process has become more receptive to market-based instruments. Beginning in the 1970s, the U.S. Environmental Protection Agency (EPA) offered states the option of employing variants of tradeable permits for the control of localized, criteria air pollutants. More significantly, tradeable-permit systems were used in the 1980s to accomplish the phasedown of lead in gasoline, and to facilitate the phaseout of ozone-depleting chloroflourocarbons (CFCs); and in the 1990s to implement stricter air pollution controls in the Los Angeles metropolitan region, and – most important of all – to control acid rain under the Clean Air Act amendments of 1990 (Table 2). This last program – the trading of sulfur dioxide (SO_2) emissions allowances to reduce acid rain – is saving the country $1 billion per year in compliance costs, while achieving the statutory goal more quickly than could have been accomplished by a conventional approach.[11]

Given the historical lack of receptiveness by the political process to market-based approaches to environmental protection, why has there been a relatively recent rise in the use of market-based approaches?[12] It would be gratifying to believe that increased understanding of market-based instruments had played a large part in fostering their increased political acceptance, but how important has this really been? In 1981, Steven Kelman surveyed Congressional staff members, and found that support and opposition to market-based environmental policy instruments was based largely on ideological grounds: Republicans, who supported the concept of economic-incentive approaches, offered as a reason the assertion that "the free market works," or "less government intervention" is desirable,

without any real awareness or understanding of the economic arguments for market-based programs. Likewise, Democratic opposition was based largely upon ideological factors, with little or no apparent understanding of the real advantages or disadvantages of the various instruments (Kelman 1981). What would happen if we were to replicate Kelman's survey today? My refutable hypothesis is that we would find increased support from Republicans, greatly increased support from Democrats, but insufficient improvements in understanding to explain these changes.[13] So what else has mattered?

First, one factor has surely been increased pollution control costs, which have led to greater demand for cost-effective instruments. By the late 1980s, even political liberals and environmentalists were beginning to question whether conventional regulations could produce further gains in environmental quality. During the previous twenty years, pollution abatement costs had continually increased, as stricter standards moved the private sector up the marginal abatement-cost function. By 1990, U.S. pollution control costs had reached $125 billion annually, nearly a 300% increase in real terms from 1972 levels (U.S. Environmental Protection Agency 1990; Jaffe, Peterson, Portney, and Stavins 1995).

Second, a factor that became important in the late 1980s was strong and vocal support from some segments of the environmental community.[14] By supporting tradeable permits for acid rain control, the Environmental Defense Fund (EDF) seized a market niche in the environmental movement, and successfully distinguished itself from other groups.[15]

Related to this, a third factor was that the SO_2 allowance trading program, the leaded gasoline phasedown, and the CFC phaseout were all designed to *reduce* emissions, not simply to *reallocate* them cost-effectively among sources. Market-based instruments are most likely to be politically acceptable when proposed to achieve environmental improvements that would not otherwise be feasible (politically or economically).

Fourth, deliberations regarding the SO_2 allowance system, the lead system, and CFC trading differed from previous attempts by economists to influence environmental policy in an important way: the separation of ends from means, that is, the separation of consideration of goals and targets from the policy instruments used to achieve those targets. By accepting – implicitly or otherwise –

the politically identified (and potentially inefficient) goal, the ten-million ton reduction of SO_2 emissions, for example, economists were able to focus successfully on the importance of adopting a cost-effective means of achieving that goal.

Fifth, acid rain was an unregulated problem until the SO_2 allowance trading program of 1990; and the same can be said for leaded gasoline and CFCs. Hence, there were no existing constituencies – in the private sector, the environmental advocacy community, or government – for the *status quo* approach, because there was no *status quo* approach. We should be more optimistic about introducing market-based instruments for "new" problems, such as global climate change, than for existing, highly regulated problems, such as abandoned hazardous waste sites.

Sixth, by the late 1980s, there had already been a perceptible shift of the political center toward a more favorable view of using markets to solve social problems. The George H. W. Bush Administration, which proposed the SO_2 allowance trading program and then championed it through an initially resistant Democratic Congress, was (at least in its first two years) "moderate Republican;" and phrases such as "fiscally responsible environmental protection" and "harnessing market forces to protect the environment" do have the sound of quintessential moderate Republican issues.[16] But, beyond this, support for market-oriented solutions to various social problems had been increasing across the political spectrum for the previous fifteen years, as was evidenced by deliberations on deregulation of the airline, telecommunications, trucking, railroad, and banking industries. Indeed, by the mid-1990s, the concept (or at least the phrase), "market-based environmental policy," had evolved from being politically problematic to politically attractive.

Seventh and finally, the adoption of the SO_2 allowance trading program for acid rain control – like any major innovation in public policy – can partly be attributed to a healthy dose of chance that placed specific persons in key positions, in this case at the White House, EPA, the Congress, and environmental organizations.[17] The result was what may remain the golden era in the United States for market-based environmental strategies.

3. Outlook

Despite the arguments made for decades by economists and many others, there seems to be little political support in the United States for broader use of benefit-cost analysis to assess proposed or existing environmental regulations. These analytical methods remain on the periphery of policy formulation. As long as leaders on both sides of the debates in the policy community continue to react on ideological bases to proposals for such "regulatory reform," the status quo is unlikely to change.[18] Perhaps the significant changes that have taken place over the past twenty years with regard to market-based environmental policy instruments can provide a model for progress.

Certainly the change has been dramatic. Market-based instruments have moved center stage, and policy debates today look very different from those twenty years ago, when these ideas were routinely characterized as "licenses to pollute" or dismissed as completely impractical.[19] Market-based instruments are considered seriously for each and every environmental problem that is tackled, ranging from endangered species preservation to regional smog to global climate change (Stavins 1997). It is reasonable to anticipate that market-based instruments will enjoy increasing acceptance in the years ahead.

Of course, no particular form of government intervention, no individual policy instrument – whether market-based or conventional – is appropriate for all environmental problems. Which instrument is best in any given situation depends upon a variety of characteristics of the environmental problem, and the social, political, and economic context in which it is being regulated. There is no policy panacea. But economic instruments are now part of the available policy portfolio, and ultimately that is good news both for environmental protection and economic well-being.

TABLE 1: COSTS OF SELECTED ENVIRONMENTAL, HEALTH, AND SAFETY REGULATIONS THAT REDUCE MORTALITY RISKS

Regulation	Year Issued	Agency	Cost per Statistical Life Saved (Millions of 2002 Dollars)
Logging operations	1994	OSHA	0.1
Unvented space haters	1980	CPSC	0.2
Trihalomethane drinking water standards	1979	EPA	0.3
Food Labeling	1993	FDA	0.4
Passive restraints/belts	1984	NHTSA	0.5
Alcohol and drug control	1985	FRA	0.9
Seat cushion flammability	1984	FAA	1.0
Side-impact standards for autos	1990	NHTSA	1.1
Low-altitude windshear equipment and training standards	1988	FAA	1.8
Children's sleepwear flammability ban	1973	CPSC	2.2
Benzene/fugitive emissions	1984	EPA	3.7
Ethylene dibromide drinking water standard	1991	EPA	6.0
NOx SIP Call	1998	EPA	6.0
Radionuclides/uranium mines	1984	EPA	6.9
Grain dust	1988	OSHA	11
Methylene chloride	1997	OSHA	13
Arsenic emissions standards for glass plants	1986	EPA	19
Arsenic emissions standards for copper smelters	1986	EPA	27
Hazardous waste listing for petroleum refining sludge	1990	EPA	29
Coke ovens	1976	OSHA	51
Uranium mill tailings (active sites)	1983	EPA	53
Asbestos/construction	1994	OSHA	71
Asbestos ban	1989	EPA	78
Hazardous waste management/ wood products	1990	EPA	140
Sewage sludge disposal	1993	EPA	530
Land disposal restrictions/phase II	1994	EPA	2,600
Drinking water/phase II	1992	EPA	19,000
Formaldehyde occupational exposure limit	1987	OSHA	78,000
Solid waste disposal facility criteria	1991	EPA	100,000

Source is Morrall (2003). Only final rules are included. Estimates are from respective agencies. Non-mortality and non-health benefits were subtracted from the annual cost (numerator) to generate net cost. For each entry, the denominator is the estimated number of statistical lives saved by the regulation annually. Agency abbreviations are as follows. CPSC: Consumer Product Safety Commission; EPA: Environmental Protection Agency; NHTSA: National Highway Traffic Safety Administration; FAA: Federal Aviation Administration; FRA: Federal Railroad Administration; OSHA: Occupational Safety and Health Administration

TABLE 2: MAJOR U.S. TRADEABLE PERMIT SYSTEMS

Program Traded	Commodity	Period of Operation	Environmental and Economic Effects
Emissions Trading Program	Criteria air pollutants under the Clean Air Act	1974–Present	Environmental performance unaffected; total savings of $5-12 billion
Leaded Gasoline Phasedown	Rights for lead in gasoline among refineries	1982–1987	More rapid phaseout of leaded gasoline; $250 million annual savings
Water Quality Trading	Point-nonpoint sources of nitrogen & phosphorous	1984–1986	No trading occurred, because ambient standards not binding
CFC Trading for Ozone Protection	Production rights for some CFCs, based on depletion potential	1987–Present	Environmental targets achieved ahead of schedule; effect of TP system unclear
Heavy Duty Engine Trading	Averaging, banking, and trading of credits for NOx and particulate emissions	1992–Present	Standards achieved; cost savings unknown
Acid Rain Reduction	CO_2 emission allowances; mainly among electric utilities	1995–Present	CO_2 reductions achieved ahead of schedule; annual savings of $1 billion per year
RECLAIM Program	CO_2 and NOx emissions by large stationary sources	1994–Present	Unkown
Northeast Ozone Transport	Primarily NOx emissions by large stationary sources	1999–Present	Unkown

Source: Stavins (2003).

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Endnotes

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1. There is a third important dimension of the role of government. What level of government should be delegated responsibility and authority: local, state, regional, Federal, multinational, or global? There is, of course, no general answer. The answer will depend upon specific characteristics of individual environmental policy issues. The debates on this question have often been analytically flawed. For clarification, see: Revesz 1997.

2. Externalities in the environmental realm are not bilateral, but involve public goods with multi-party impacts. Transaction costs and third-party impacts preclude the possibility of private negotiation leading to simple, efficient solutions (Coase 1960). For largely the same reasons, private tort litigation – with its considerable transaction costs – will not solve the bulk of environmental problems.

3. See: Arrow, Cropper, Eads, Hahn, Lave, Noll, Portney, Russell, Schmalensee, Smith, and Stavins (1996).

4. During the 1990s, equity concerns played increasing roles in environmental policy debates (Hahn, Olmstead, and Stavins 2003). President Clinton's Executive Order 12866 was the first among the series of Presidential executive orders dealing with regulatory analysis to include distributional concerns. Also, the "property rights movement" in the western United States was fundamentally about the distribution of regulatory costs (particularly in the context of the Endangered Species Act and wetlands regulation under Section 404 of the Clean Water Act).

5. Statutes that have been interpreted (in part, at least) to restrict the ability of regulators to consider benefits and costs include: the Federal Food, Drug, and Cosmetic Act; health standards under the Occupational Safety and Health Act; safety regulations from National Highway and Transportation Safety Agency; the Clean Air Act; the Clean Water Act; the Resource Conservation and Recovery Act; and the Comprehensive Environmental Response, Compensation, and Liability Act. On the other hand, parts of the Clean Water Act, the Consumer Product Safety Act, the Toxic Substances Control Act, the Federal Insecticide, Fungicide, and Rodenticide Act, and the Safe Drinking Water Act explicitly allow or require regulators to consider benefits and costs.

6. This is by no means an argument against lobbying per se. On the contrary, lobbying activities by interest groups and individuals on all sides of issues is a fundamental aspect of the nation's pluralistic system. In this regard, a participant in the Aspen workshop pointed out that it would be preferable to have lobbying activity focus on technical points (such as in a benefit-cost framework) than on ethical assertions and sweeping generalizations. In any event, there is rigorous, empirical evidence that agencies do take into account benefits and costs of regulatory decisions, even when governing statutes do not encourage or allow such analysis to affect decisions. See, for example: Cropper et al. 1992.

7. On the other hand, it should be recognized that the Office of Information and Regulatory Affairs (in the U.S. Office of Management and Budget), which reviews draft regulations and manages the process of receiving Regulatory Impact Analyses from the departments and agencies, was itself established by the Congress (through the Paperwork Reduction Act of 1980).

8. But President Clinton did sign the Small Business Regulatory Reform Act of 1996, which provides an opportunity for the Congress to pass legislation that nullifies a regulation that does not pass a benefit-cost test (the nullification itself is then subject to possible Presidential veto, like any act of Congress).

9. Proposals for the use of a benefit-cost test for setting environmental standards have found a more receptive audience among the states. As of 1996, some 25 of 35 states surveyed reported significant environmental regulatory reform efforts, defined as including the establishment of benefit-cost criteria for promulgation of regulations (Graham and Loevzel 1997). On the other hand, a participant in Aspen conference pointed out that in at least one state the increased use of benefit-cost analysis of regulations had also led to increased litigation. Another participant noted that this unintentional consequence can be avoided by careful wording of the law or regulation that calls for the analysis, as was done with the analytical requirements in the Safe Drinking Water Act amendments of 1996.

10. Diverse factors have caused command-and-control instruments to so dominate environmental regulation. See: Keohane, Revesz, and Stavins (1998).

11. For a detailed survey of the use of market-based instruments for environmental protection in the United States, as well as other nations, see: Stavins (2003).

12. For a more thorough exploration of the answers to this question, see: Stavins (1998).

13. But there has been some increased understanding of market-based approaches among policy makers. This has partly been due to increased understanding by their staffs, a function – to some degree — of the economics training that is now common in law schools, and the proliferation of schools of public policy (Hahn and Stavins 1991).

14. But the environmental advocacy community is by no means unanimous in its support for market-based instruments. See, for example, Seligman 1994.

15. When the memberships (and financial resources) of other environmental advocacy groups subsequently declined with the election of the environmentally-friendly Clinton-Gore Administration, EDF continued to prosper and grow (Lowry 1993). In 2003, the World Resources Institute was alone among environmental advocacy groups to support the George W. Bush administration's water quality trading policy.

16. The Reagan Administration enthusiastically embraced a market-oriented ideology, but demonstrated little interest in employing actual market-based policies in the environmental area. From the Bush Administration through the Clinton Administration, interest and activity regarding market-based instruments – particularly tradeable permit systems – continued to increase, although the pace of activity in terms of newly implemented programs declined during the Clinton years, when a considerable part of the related focus was on global climate policy (Hahn, Olmstead, and Stavins 2003).

17. Within the White House, among the most active and influential enthusiasts of market-based environmental instruments were: Counsel Boyden Gray and his Deputy John Schmitz, Domestic Policy Adviser Roger Porter, Council of Economic Advisers (CEA) Member Richard Schmalensee, CEA Senior Staff Economist Robert Hahn, and Office of Management and Budget Associate Director Robert Grady. At EPA, Administrator William Reilly – a "card-carrying environmentalist" – enjoyed valuable credibility with environmental advocacy groups; and Deputy Administrator Henry Habicht and Assistant Administrator for Air and Radiation William Rosenberg were key, early supporters of market-based instruments. In the Congress, Senators Timothy Wirth and John Heinz provided high-profile, bi-partisan support for the SO2 allowance trading system and, more broadly, for a wide variety of market-based instruments for environmental problems through their "Project 88" (Stavins 1988). And, finally, in the environmental community, EDF Executive Director Fred Krupp, Senior Economist Daniel Dudek, and Staff Attorney Joseph Goffman worked closely with the White House to develop the initial allowance trading proposal.

18. There continues to be more rhetoric than understanding about what is really entailed in an economic perspective of environmental problems. For a response to the "straw men" frequently set up and attacked by those hostile towards an economic viewpoint, see: Fullerton and Stavins (1998).

19. Although such ethical objections to the use of market-based environmental strategies have greatly diminished, they have by no means disappeared (Sandel 1997).

The Challenge of Meeting Economic and Environmental Goals Simultaneously: An Investor's Perspective

Barbara Krumsiek

In the course of over 200 years of commercial enterprise in the United States, there are perhaps two sure-fire statements to stop a conversation on business and the environment in its tracks. The first is that any effort to attain higher environmental performance creates cost and compromises shareholder value, and the second related comment, is that to compromise shareholder value could lead to litigation. These two threats, share price declines and litigation, are, generally speaking, showstoppers that have been used to great effect in boardrooms across America.

But the winds of change are upon us. I would like to suggest that we are entering an era when in which it will be unexceptional, and in fact expected because it will increasingly be viewed as necessary, that businesses meet financial and environmental challenges simultaneously. We have not quite reached the stage of suggesting this is like walking and chewing gum at the same time, but we are getting there. The presumption that environmental and financial goals are mutually exclusive suggests a limitation on the ingenuity of corporate management, and a limitation on the quality of innovation in environmental management, that is being debunked with ever increasing frequency.

A growing number of investors, traditionally called socially responsible investors in this country and sustainable investors in Europe, are so committed to this notion, that environmental criteria have been fundamentally integrated into the analytical process when assessing a company for potential as a portfolio holding. A still larger number of investors have taken to heart that reducing environmental liabilities reduces investment risk. These investors view the assessment of corporate social responsibility in portfolio companies as "risk management." That is a start, and moves us in the same direction. Increasingly, corporations around the world are more likely to adopt the view that environmental protection is not simply a matter of compliance, and that solving environmental problems is more likely to save money than to cost it in the long run.

Certainly, this change is not monolithic. There are, and probably always will be, company managers whose only view of environmental protection is, "What do I have to do?" and whose major question is, "How little can I spend to do it?" But the ranks of companies that are making affirmative commitments to environmental protection, and admitting that this saves them money, are growing. For example, Baxter International estimates that its total income, savings, and cost avoidance resulting from its environmental programs totaled $65 million in 2002, and includes an environmental financial statement in its sustainability report detailing the costs and savings of all its environmental initiatives.[1] DuPont, which launched a global initiative to become a zero-waste company, reported in 2002 that "in most cases the reduction in waste generated and the improvement in energy efficiency have resulted in very positive financial benefits." [2]

It is crucial to note that both Baxter and DuPont report the results of their progress in *financial* terms, not just economic terms. There are reservoirs of studies that show the economic benefits of environmental protection, in terms of reduced morbidity and mortality, lowered energy costs, and the like. But in many cases, these benefits cannot be captured by the companies whose actions created the benefits. For healthy environments and economic growth to be viewed as mutually reinforcing, rather than competing values, the corporate financial math must work as well as the economics for society as a whole.

Calvert's analysis of potential portfolio companies includes a review of a range of corporate practices in the following areas: environmental performance;

corporate governance; workplace management, including an examination of the company's record with respect to women and minority representation on the Board and in senior management; human rights policies and practices in overseas operations; indigenous peoples' rights; and product safety.

While investors in socially responsible or sustainable investing are frequently motivated by a desire to invest in accordance with deeply held values, it comes as no surprise that these investors have no less an appetite for financial returns than those who believe the numbers alone tell the whole tale. So has this attention to environmental performance translated into superior market performance? The evidence is anecdotal, but compelling nonetheless. Over the three calendar years, 2000–2002, Calvert's domestic equity fund performance ranked in the top ten among all mutual fund families, as reported by *Barron's*. Specifically, Calvert's equity funds ranked 6th among 81 fund families in 2002, 3rd among 87 fund families in 2001, and 3rd among 84 families in 2000. [3]

On a broader scale, the Social Investment Forum reports that over 70% of the largest socially responsible mutual funds received top marks from Morningstar and Lipper Analytical Services, Inc. A total of 62% of the full universe of social funds earn highest ratings. Of the 53 socially screened funds with a three-year performance record tracked by the Social Investment Forum, 33 (62%) received the highest marks from either Lipper or Morningstar. According to the Forum, 26 (49%) of the funds tracked received an "A" or "B" ranking from Lipper based on one- and/or three-year total returns within their investment categories. A total of 20 screened funds (37%) earned either four or five stars from Morningstar for at least three-year risk-adjusted performance. A number of the funds earned top rankings from both organizations. Both the Lipper and Morningstar analyses are based on time periods ending December 31, 2003.[4] Evidence will continue to build from the record of the benchmarks of sustainable company performance that have emerged in recent years, including the Dow Jones Sustainability Index, the Calvert Social Index, and the Domini Social Index.

The prospect of enhanced access to capital markets through superior environmental performance should be an alluring "carrot" for corporate managements, their Boards, and their shareholders, sufficiently appealing to cause them to devote considerable energy to environmental improvements. But while there is some prospect of stepped-up demand for social and sustainable investing world-

wide, it is an evolving and slow journey to date. Even sectors one would expect to flock to sustainable investing strategies such as endowments, foundations, and even environmental organizations, have not yet reconciled the contradiction in their missions and their investment strategies. The amount of capital committed to socially responsible and environmental investing is growing, but not sufficiently fast to provide the incentive of enhanced access to capital markets to management teams that implement environmental improvements.

So if the "carrot" is insufficiently motivating, what about the "stick"? New environmental regulation is unlikely to be forthcoming. Most of our environmental laws were passed in the 1960s and 1970s, with a few in the 1980s. But the ability of the federal government to produce new environmental regulation has slowed to a snail's pace, often requiring a crisis to precipitate action. So can business leaders be expected to achieve environmental objectives in the absence of mandatory environmental requirements?

Business leaders have demonstrated repeatedly that the answer to this question is an emphatic yes. Between 1997 and 2002, for example, Baxter reduced its emissions of air toxics by 81%, its energy use by 19%, its packaging by 15%, and its water use by 9%.[5] Whirlpool's line of household products generates sales of over $11 billion while also exceeding energy efficiency standards by 40%.[6] And this was without a regulatory mandate.

Many corporations are also making excellent progress toward the goal of reducing greenhouse gas emissions, the culprit behind climate change, which is the most profound and potentially destructive environmental problem of our age. The ranks of companies that have undertaken and are meeting goals to reduce greenhouse gas emissions include BP, Shell, Staples, DuPont, Ford, Intel, and scores of others, from the world's largest corporations to some so small that few of us have heard of them.

Almost all of this progress was undertaken on principle, rather than as a result of regulation. Certainly the prospect of future regulation is driving some of these decisions, but corporate values supporting responsible citizenship have been a much more powerful impeller. Some may always need to hear the "business case" for progress, but the examples noted here, and no doubt there are others, demonstrate that corporations can work towards environmental goals that are neither financially rewarding, nor mandated, but are simply the right thing to do.

But is it enough? To that question we must reply with an equally emphatic no. It is unequivocally true that business leaders will always undertake environmental programs that go well beyond the purview of regulation. But there are at least as many laggards as there are leaders, and there is a vast, mushy middle composed of companies that aim merely for compliance.

There is perhaps one force even more powerful, arguably, than that played by government regulation. To the investment community, the pen of disclosure is at least as mighty, if not mightier, than the sword of regulation. Information is the currency of financial markets. The principle of full and fair disclosure is behind our system of financial reporting that, despite the experience of the last two or three years, has served to lubricate the engine of financial markets. In fact, the experience of the recent past, with its notable failures of corporate governance, stemmed as much from people concealing information about their financial dealings as from the nature of the arrangements themselves.

A recent study by Standard & Poor's supports the notion that disclosure alone has value. According to S&P, investors worldwide will pay a premium for information: corporations that disclose greater amounts of information trade at premium prices to those that do not. Specifically, the study shows a clear inverse relationship between transparency and disclosure rankings and market risk. The negative correlation shows that the lower the disclosure, the less information there is about the company and therefore the higher the market risk and the higher the cost of capital. In addition, the study shows a positive correlation between voluntary disclosure rankings and price-to-book values suggesting that U.S. companies that provide more voluntary disclosure command a higher stock price.[7]

Disclosure is not without its perils, of course. Corporations are always wary of exposing themselves to potential liability, and after Nike's recent court experiences focusing on whether their corporate communications about human rights were commercial or protected speech, a few corporations (including Nike) have announced that they will no longer publish sustainability or social reports. The interesting thing is not that some corporations shied away from disclosure; rather, it is far more interesting that so few of them did so.

Unlike financial reporting, corporate reporting of environmental performance is largely optional. Yet growing numbers of companies publish information about their environmental performance, and significantly, about their progress toward quantitative goals, such as reduction in greenhouse gas emissions or hazardous waste production. They do so not because they have to, in most cases, but because such reporting is becoming an admission ticket to the club of socially responsible businesses. That club is more than corporate feel-good. It is about corporate reputations, and reputation, at a time when significant proportions of corporate value are intangible, is very important. A trusted brand can be worth tens or hundreds of millions of dollars of market value to a corporation.

Voluntary reporting initiatives that include environmental metrics (CERES, GRI, and Global Compact) are on the rise, albeit rather more slowly in the United States than in Europe, or even the developing world. But those corporations that issue such reports are rewarded with a more favorable review from social and sustainable investors. Corporations whose brands are exposed to millions of consumers are concerned about their reputations, and are more willing to disclose environmental performance. However, not all corporations are household names. For those companies, environmental progress may only become a priority when the investment community insists on such reporting as a prerequisite to raising capital and attracting long-term equity and debt investment.

One of the most positive steps governments can take, then, is to require disclosure of social and environmental performance, just as financial disclosure is required. Once the initial data-gathering systems are in place, such systems are not terribly costly to companies, and many of those who began environmental reporting skeptically, or even grudgingly, have discovered that they were dealing with far greater costs for cleanup and mitigation than they had ever suspected, and that they have been able to save money by reducing pollution. It is through such efforts that companies like Baxter and DuPont are able to report financial benefits from improving their environmental performance.

For governments, disclosure offers the ability to make progress in protection of citizens without the third rail of gridlock that other new regulation almost always touches. While we may not be able to pass a bill in Congress that would establish regulation of greenhouse gas emissions, we may be able to require disclosure of those emissions. It is at least, worth a good try.

In short, environmental progress need not be a financial ball-and-chain to corporations, particularly if it helps to distinguish those that are nimbler or more innovative from their peers. For DuPont, for instance, the drive to eliminate workplace accidents and become the safest company on earth has not only made the company the platinum standard for workplace safety, but also has spawned a business of safety that is worth $3.5 billion to the company today.[8]

Financial institutions have a compelling role to play in moving corporations to ever higher levels of environmental performance. The day will soon come when it is no longer "neutral" to determine how, and at what price, we link those with capital to those in need of capital, without consideration of corporate environmental performance.

Endnotes

1. Baxter International Inc., *Sustainability Report 2002*, page 50.
2. E. I. du Pont de Nemours and Company, *Sustainable Growth 2002 Progress Report*, page 4.
3. *Barron's*, Dow Jones & Company Inc., February 2001, February 2002, February 2003.
4. "Over 70 Percent of Largest Socially Responsible Mutual Funds Got Top Marks from Morningstar, Lipper in 2003," Social Investment Forum, News Release, January 27, 2004.
5. Baxter International Inc., page 39.
6. The 2002 Whirlpool Corporation Annual Report and Calvert estimates taken from PR Newswire, September 8, 1997, company history in 1990s from the Whirlpool company website at www.whirlpool.com, and Professional Builder (1993), March 1, 2001.
7. Sandeep A. Patel and George Dallas, Standard & Poor's, *Transparency and Disclosure: Overview of Methodology and Study Results–United States*, October 16, 2002.
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How a Corporate CEO Views the Environment and the Economy

James E. Rogers

Introduction

Cinergy Corp.[1] has a long-standing commitment to balancing the needs of *all* of its stakeholders, including its environmental constituents. With the 1994 merger of The Cincinnati Gas & Electric Company and PSI Energy in Indiana to form Cinergy, we decided to hold ourselves to high performance standards built around satisfying multiple stakeholders. As a result, our board and management team base their decisions on this multiple-stakeholder approach. This isn't easy, nor is it conventional. In my letter to stakeholders in Cinergy's 1996 annual report, I wrote: "We are willing to make the tough choices, but we are unwilling to accept false tradeoffs… between serving the interests of shareholders and honoring our commitments to our employees, investors, customers, communities and the environment…. Every decision I make as CEO will continue to be based on creating value for all of our stakeholders."

Let me expand on this statement in the context of the three questions posed by the organizers of this Forum.

1. Can business leaders be expected to achieve serious environmental objectives that may reduce near-term earnings, in the absence of mandatory environmental requirements? Have they adequately explored the ways in which environmental improvements can be profitable?

In many industries, environmental performance and corporate profits are aligned since any emissions or releases into the environment represent unwanted waste and production inefficiencies, additional costs for permits and compliance assurance, and increased environmental risk. In most situations, reduced emissions or releases translate into more product to sell for less cost. This is a win for both the shareholders and the environment. And it is the way that a great many corporations are showing that investments in environmental improvements can be just as profitable as the firm's other investments.

The issue is far harder where, as the question poses, environmental objectives may reduce near-term earnings. This would seem to be the challenge facing power generators who rely on the combustion of coal to produce power. In my industry, emissions controls cost more than the generating stations themselves and these "bolt on" controls siphon off a significant portion of the power output of the plant. For instance, the wet "scrubber" used to eliminate SO_2 emissions from coal-fired power plants can cost as much as $200 million per generation unit while taking as much as 2 percent of the unit's output for operation of the device. Obviously, any program to retrofit controls on the portion of the coal fleet that is not fully controlled requires huge capital outlays and negatively impacts the amount of electricity available to be sold.

In addition, the confusing and conflicting environmental regulatory scheme the industry faces makes it difficult to anticipate with the necessary certainty what controls to install at which units. This is why Cinergy has championed the creation of workable, comprehensive multi-emissions legislation that will create simple targets and timetables for power plant emissions reductions.

Finally, there are significant competitive risks associated with acting as a volunteer and ahead of an industry-wide mandate. Again the high capital costs, increased variable costs and, in some cases, loss of operational flexibility associated with major pollution control projects at coal-fired units may negatively impact the units' dispatch and profitability.

So in this industry, the considerable progress we have made has been driven by government programs such as the Clean Air Act. For instance, since 1980, the electric power industry has reduced its air emissions significantly while electricity generation from coal has increased 64 percent. The industry dramatically reduced its rate of emissions of sulfur dioxide (SO_2) by 50 percent and nitrogen oxide (NOx) by 45 percent. We have also reduced particulate matter (PM10) by over 90 percent. Moreover, because some particulate matter, SO_2 and NOx controls have some mercury reduction co-benefits, our industry has also reduced mercury emissions significantly by almost 40 percent – from 75 tons per year to approximately 48 tons per year. Our industry has accomplished all of this despite a steady climb in electricity demand, a growing economy and without sacrificing the reliability and affordability of the electricity that we produce.

Cinergy itself has invested considerable sums in clean air compliance. Since the early 1990s, we've spent more than $700 million, primarily to meet the SO_2 and NOx requirements of Title IV of the Clean Air Act. And we just spent another $200 million to repower an older coal plant in Indiana to natural gas. That's a total of $900 million. Between 2000 and 2005, we will spend a total of $800 million on additional pollution control equipment aimed at to meet additional NOx emissions to meet EPA's ozone transport rule.

Going forward, I fully expect that the next round of reductions from coal-fired power plants will be driven by federal legislation that sets environmentally-responsible targets for further progress but provides industry with sufficient time to undertake the retrofits necessary and sufficient flexibility to allow us to craft the lowest cost compliance strategy possible.

The right multi-emission bill will benefit electricity producers, consumers and the environment, by:

- Locking in major emission reductions targets
- Locking in a fixed timeline for those reductions so that planning and implementation of emissions control strategies can begin today
- Coordinating reductions so that utilities are able to use multi-pollutant control technology
- Providing the electric industry with the time necessary to attract capital for the multi-billions of investments that will be needed to meet the new requirements

- Maintaining coal as a generation fuel thereby preserving natural gas reserves for consumers, farmers and businesses
- Providing flexibility through market-based programs such as emissions trading and early reduction credits
- Lowering the bill for consumers

We believe these provisions are found in the "Clear Skies Act," S. 485, now pending in Congress. This bill would require the most ambitious emissions reductions ever from power plants, ensuring air quality results that are cleaner, sooner, and cheaper. The emissions reductions would be rock solid, due to continuous emissions monitoring and large penalties for non-compliance. The targets and timetables in S. 485 are ambitious and, for many small companies and public power systems, extremely painful. This is especially true for the first phase of this legislation.

To meet the targets of S. 485, we estimate our capital expenditures *for just pollution control equipment* would top $1.5 billion. And, unfortunately for Cinergy and most other utilities, these costs are not back-loaded. We estimate that more than two-thirds of these expenditures will be necessary by 2010 to meet the first phase of the Clear Skies targets.

This is not to say that Cinergy cannot and will not act without government environmental mandates. For instance, Cinergy recently announced a voluntary commitment to reduce its greenhouse gas (GHG) emissions to a level equivalent to 5 percent below 2000 levels by 2010. This commitment will be supervised by the national environmental group, Environmental Defense, and includes a commitment to provide a full disclosure of GHG emissions during each year leading up to the target. Cinergy has also pledged to spend $21 million on programs between now and 2010 that will help the company achieve this target.

Cinergy took on this program for several reasons. First, the program responds to concerns from environmental stakeholders while reducing the business risk we face from this issue. Second, we believe there are economic advantages to being an early mover in this area and to increasing the company's internal capabilities to manage our GHG emissions. Finally, the target we selected allows us to continue to use coal as our primary fuel for our plants, thus preserving U.S. fuel diversity and Cinergy's ability to deliver affordable, reliable power to its customers.

2. Many businesses work towards a "triple-bottom-line" of economic, environmental and social improvements. In real business situations, do non-economic goals have equal standing with traditional finan cial goals?

Absolutely. This is the cornerstone of a multiple-stakeholder approach that I mentioned at the outset. This is also what the current focus on building, running and managing sustainable businesses is all about. Due to our multiple-stakeholder approach, Cinergy was practicing sustainability well before the word was in vogue. We did this not only out of an ethic that this was the right thing to do, but also out of a conviction that there really is a gain for shareholders when a corporation is viewed by its employees as a good place to work; and when it is viewed by its customers as a good neighbor in the community, and viewed by its regulators as a responsible steward of the environment.

As CEO, my devotion to the financial performance of the company must be unwavering. And I am proud of the financial performance of Cinergy during my tenure. But I am equally proud of the non-economic achievements we have had as well.

Social

Creating jobs and a vibrant economy are cornerstones of successful communities and an important part of a corporation's social agenda. This is but one of the major reasons Cinergy uses its leading economic development program and our district managers to work closely with our partners in state and local governments to attract new business and industry to our region. Our low rates, reliability and reputation as a company that can get things done have helped Ohio, Kentucky and Indiana successfully market themselves to a number of new promising enterprises.

In addition Cinergy Foundation has contributed $43 million over the past 12 years (Cinergy, PSI and CG&E) in the communities we serve with an emphasis on education, health, environment and the arts. And, Cinergy was recently recognized by the U.S. Department of Labor for its employee diversity efforts. Also, the company is one of only two Ohio companies, and one of only two utility companies in the U.S., named to Working Mother magazine's list of the 100-best companies for working mothers for seven consecutive years. Until 2002 and for five years running, Cinergy was the only utility company on the list. We took these steps because they were simply the right thing to do, especially for a business with a multiple stakeholder focus.

We've also been a leader in corporate governance and before it became a major focus with the corporate scandals of the last two years. In 1996, the Cinergy board was one of the first to have a corporate governance committee (then called a nominating committee) and more recently, we were the fourth company in the nation and the first utility company to announce in 2002 that we would expense stock options beginning with the 2003 cycle. We currently rank 8th and we are the only utility in the top 10 companies ranked for excellence in corporate governance by International Shareholder Services. Again, our focus on balancing and weighing the needs of all of our stakeholders was and continues to be the driver of this focus.

Environment

Beyond our voluntary greenhouse gas commitment and environmental investments I discussed in response to Question 1, Cinergy has several other environmental accomplishments:

Environmental Leadership Pledge: With a multiple stakeholder focus, we are committed to protecting the environment at all times and being good neighbors in the communities in which our power plants operate. As such we are committed to finding ways to generate electricity in environmentally benign ways.

Before our merger, PSI was the only electric utility to support the amendments to the Clean Air Act. One of the first acts of the new Cinergy Board of Directors back in 1994 was to approve a formal Environmental Leadership Pledge. The pledge has served as the guiding force in making our plants more efficient and our product – electricity generation – less degrading to the environment.

In 2003, our board of directors updated and amended our 1994 pledge to reflect their focus on the principles of running a sustainable business.

Cinergy Corp. Environmental Leadership Pledge

Cinergy and its subsidiaries will be industry leaders in protecting our environment. We will meet or exceed all applicable regulatory requirements. We will conduct our business with respect for the environment, while providing our customers with low cost, reliable and efficient energy services.

Corporate Citizenship

Cinergy accepts the responsibility of reducing the impact of its operations on the air, water and land. Its management will be responsible for complying with all environmental regulations and will include potential environmental impacts in its planning processes. The company will ensure its employees are comprehensively trained in job procedures that protect the environment. The company will encourage employees to understand the environmental significance of their jobs and will reward them for superior environmental performance and innovation.

Employee Responsibility

Our employees will work with respect for and be good stewards of the environment.

Open Reporting and Auditing

We will measure the progress of the company and our employees in meeting this Pledge. We will present an annual environmental performance review to the Cinergy Corp. Board of Directors. We will conduct periodic environmental audits on our facilities and make available to the public an annual report that details our progress toward meeting this Pledge and associated targets.

Natural Resources Stewardship

We will be a responsible steward of the earth's resources and will identify opportunities within and outside the company that will allow us to enhance the natural environment.

Pollution Prevention

We will identify and implement opportunities to reduce our waste streams, beneficially reuse coal ash and other residual products, recycle and improve operating efficiency. We will challenge ourselves to seek new ways to reduce the environmental footprint of our operations and we will help our customers do the same.

Emergency Preparedness and Response

We will continually develop and evaluate procedures designed to reduce the risk of releases to the environment. We will routinely update our emergency preparedness and response plans. If an accidental release of a harmful material does occur, we will immediately notify the appropriate authorities and the public and deploy trained and equipped personnel to clean up the site.

Research and Development

We will support the research and development of methods and practices to enhance the quality of the environment and conserve natural resources. We will evaluate new technologies to reduce emissions, minimize waste and increase energy efficiency.

Environmental Advocacy

- We will be a leader in advocating a progressive environmental public policy.
- We will communicate this Pledge to all our stakeholders and will provide our employees the education, training and resources to implement it effectively.

Dow Jones Sustainability Index: Putting it all together, we believe that this is why this past September, Cinergy was added to the Dow Jones Sustainability Index (DJSI), an international benchmark of corporate commitment to social, economic and environmental responsibility. Cinergy ranks as the #1 sustainable utility in the United States and the #3 utility in the world. And in the context of question #2 above, our challenge and our objective is to continuously improve to remain on the DJSI.

We have never wavered from our stewardship to all of our stakeholders. We believe it is the right thing to do to ensure our continued success and to ensure the best results for our shareholders.

3. Is the failure to include certain "external" environmental costs a significant market-pricing failure? And, if so, can it be fixed?

There used to be considerable concern that United States industrial production created significant environmental damage without consequence. Because that damage was "free," the enterprise did not need to include any costs associated with avoidance of the harm or remediation when it priced its goods. These costs were external to the functioning of the market and thus represented a market failure.

For the most part, those days are long gone.

Coal-fired power plants, for instance, now face a "telephone book" full of regulations applicable to their operations, from the unloading of the coal to combustion to disposal of the waste. For air pollution, plants must comply with stringent NOx, SO_2 and particulates requirements, all of which increase the cost structure of the plant and are therefore reflected in a plant's dispatch price. As the Clean Air Act continues to be implemented and additional reductions are needed, those costs will be added in as well.

Indeed, cap and trade emissions reductions programs directly turn requirements into perfect market signals by forcing any unit that produces products to secure an allowance equivalent to the emissions it creates. Assuming caps are set at the level currently necessary to protect the environment, the cost of the allowances issued to implement the cap will be treated as a variable cost that the unit must cover if it is to operate. The more emissions a unit has, the more allowances it needs to operate. The unit's price will directly reflect the cost of its environmental compliance.

Perhaps the only place where significant environmental externalities are not accounted for is in the climate area. However, I would suggest that the problem is not one of economic design but rather political will and technical clarity. Put simply: We know how to make a cap and trade program for CO2 work, if that is indeed necessary. However, there is no consensus in the United States on whether we need to take that step now, and if so, what level of reductions should be adopted over what time frame. Unless and until we in this country reach some shared vision of the problem and the necessary path forward, we will not be able

to agree on the significance of "climate externalities" or the proper policy response.

Again, Cinergy dealt with this ongoing uncertainty by constructing a voluntary GHG program that builds in a modest carbon signal into our internal economics. This will help ensure that we don't ignore this "externality." More importantly, it will force our business down a path where we will be rewarded for behavior that reduces GHG impacts no matter how these reductions are achieved. We expect this program to help Cinergy become a player on energy efficiency, distributed generation, renewables and other carbon-advantaged investments. This points the company's compass firmly towards a future built on clean energy technologies, the ultimate solution to the carbon issue.

Endnotes

1. Cincinnati, Ohio-based **Cinergy Corp.** (NYSE:CIN) has a balanced, integrated portfolio consisting of two core businesses: regulated operations and commercial businesses. Its regulated delivery operations in Ohio, Indiana, and Kentucky serve 1.5 million electric customers and about 500,000 gas customers. In addition, its Indiana regulated operations own 7,000 megawatts of generation. Cinergy's commercial business unit owns 6,300 megawatts of capacity with a profitable balance of stable existing customer portfolios, new customer origination, marketing and trading, and industrial-site cogeneration. The "into Cinergy" power-trading hub is the most liquid trading hub in the nation.

Forests and Trees: Journalism and Coverage of the Environment

Peter C. Goldmark, Jr.

Let me pose three naïve questions.

They are the kind of questions that make many intellectuals restive or scornful or both, and which they prefer to qualify, or divide into sub-questions that they would tell us were more precise and analyzable.

I will ask them in the round.

1. Does human history suggest that fundamental, large-scale adaptations in human behavior over time periods of a century or less are possible?
2. Why, in discussing most of our major contemporary issues and dilemmas, do we wind up so often asking whether the media (or the press) are doing their job in educating the public and presenting fairly and usefully the issue in question?
3. Does the short and fragile history of independent news organizations on this planet tell us anything about how they now, or might in the future better cover "environmental and related economic issues"?

I do not believe in unnecessary suspense. Let me give my answers to those questions.

To the first question: Yes. Human history does suggest that in certain circumstances human beings are capable, albeit with much travail and difficulty, of

making fundamental adaptations in their behavior. An example is the agonizing transition in the nineteenth century from a widespread reliance upon slavery that dated at least from the first agricultural settlements ten thousand years ago to the generally held contemporary conclusion that slavery has no legitimate place in human affairs.[1] The gradual fall in human fertility around the world, and in the developing world in particular, over the past two decades is another example. Humans are as likely to underestimate their own capacities as they are to misestimate the nature and scope of the challenges that confront them. As we saw when Christopher Columbus set foot upon the isle of Santo Domingo confident that he was in the East Indies, or when the British Parliament voted overwhelmingly against the introduction of daylight savings time because it would confuse the cows, human history is replete with examples of drawing wrong conclusions from data viewed through the prism of old-fashioned assumptions and of confusing the forest with the trees.

To the second question: we wind up asking if the press is doing their job because of the unique role an independent press plays in democracies. In the modern period it is primarily in democracies that we find the pluralism, the liberty, and the orneriness to raise in the rough give and take of the public arena the largest policy issues that humans face. An independent press is the oxygen of democracy, and without it little of that debate and raucous clash of ideas would take place. We gauge in part whether the public is informed by what is presented to them through the press, and we know that what the press covers and interprets is in part influenced by what the public wants to know. So press presentation and content becomes a proxy measure for the scope and accuracy of public knowledge, the intensity of public debate, and the importance to the public of an issue.

It is an imperfect gauge. It can be a lagging or leading indicator. It may be overall a rather poor indicator of what the public "needs" to know. But unfortunately we have no objective criterion for what the public "needs to know"; we have only our individual subjective opinions. So while it is fair to ask whether the press is doing its job in presenting fairly and in its true dimensions the "environmental issue", it would be foolish to expect too much from any contemporary answer to that question, because the press acts in part as a mirror of what the public knows or how the public treats the issue, and because each of us compares that reflected image with our individual opinion on what the issue is and means.

The third question, plus the parallel question posed in the invitation to this meeting ("How Do Business, Government and Media Balance the Competing Values of Economic Growth and a Healthy Environment?") lead to the meat of what the organizers have asked me to address, and I devote the rest of this essay tackling it and related issues.

I start with two commonplace observations.

First, I will used the phrase 'news organizations', 'the 'press', or 'independent news organizations' to designate that precious rarity among human institutions – an organization devoted to gathering, interpreting and presenting news without regard to commercial pressure or political influence. I am in no way a supporter of 'advocacy journalism'. And I will not use the term media, which refers to a far wider and less easily defined grouping of activities.

Secondly, the need to balance competing values is not unique to the "environmental challenge". That has been a characteristic of many, many problems. It is an ongoing and accepted role of modern government in particular and contemporary society in general to balance the competing requirements of health, fairness, civil liberties, security, economic growth, business profitability, investment climate, and so on. The protection of the environment, and more lately the requirements of sustainability going forward, are additional and important parameters in the ongoing ballet of conflict and accommodation. But the need for and presence of a balancing act are neither new nor unusual.

No. What is unique here is quite different. What is unique here is that for the first time in our history as a species, if we do not get that balancing act right – and get it right relatively soon – the terms of human existence on this planet will turn sharply for the worse.

What is unique in this story is that we have entered a period of systematic and accelerating environmental deterioration on a global scale. This danger appears gradual in the time scale of the human experience. But it is cumulative in the sense that – like tooth decay – the longer it builds, the more difficult and expensive it becomes to reverse. And in the geologic time scale this deterioration is proceeding at breakneck speed.

The possibility of progressive environmental degradation has been inherent in the particular developmental path that the pattern of human economic activity on this planet has taken over the last few hundred years. Now the time for this model of headlong exploitation of natural resources has run out. The earth is our host and we are its guests, and we are on the verge of destroying the only habitat in which we can live.

The period of deepening environmental deterioration does not lie in the future. It has begun. There are no more cod in the Grand Banks fishery. There is less fresh water, of lower quality, available in the world for drinking and household use. Water tables beneath the three largest grain-producing plains[2] and elsewhere are sinking. The world's climate is warming and threatens agricultural productivity, the availability and reliability of fresh water, the spread of tropical diseases, the destruction of low-level coastlands, and the death of some coral reefs, among other effects. Tropical forests continue to be cut and burned away every year in massive chunks.

The scale and impact of the behavior of one species have risen to such a level that they begin to destabilize and modify the biosphere itself. Discontinuous change has occurred before on the earth as the result of geological trauma or external disruptions, such as asteroids, and may occur again. But never in the history of this small planet has the activity of one species metastasized so feverishly that it started to undermine the macro-conditions that allowed it to emerge and flourish in the first place.

This is the unique characteristic of the environmental challenge, and one of the two or three decisive characteristics of our period of history. The question we must ask of the press as they cover the environment is: how will you cover this immense drama in which the human enterprise on this planet will be forced to adjust the basic terms of engagement with its own habitat? Can you find ways to cover it that are consonant with the basic values of independent journalism, and that will help the citizens of this planet understand the trends and choices as they debate difficult choices?

That is the challenge independent journalists face. They are at the very beginning of wrestling with it. Coverage by the independent press of this global drama today has about as much to do with the actual unfolding of this historical ultimatum as the coverage of European politics and military affairs in the first years

of the twentieth century had to do with the unfolding reality of the First World War. Or, to bring this home more sharply, as coverage of international terrorism by the U.S. press before September 11, 2001 had to do with the realities of the terrorist threat that we have now begun to glimpse – but which were there to see before 9/11 for those who looked. There is a herd instinct among the press, even the independent press, whereby editors – even brilliant editors who are bold and uninfluenced in other settings – fret nervously at the thought of giving disproportionate coverage to an issue, or coming at it in a strikingly different way from that chosen by their peer organizations. In the environmental area, we need an editor who will be as bold as Ben Bradlee, former editor of the Washington Post, was with Watergate. His genius was to see what other news organizations did not at first see: that Watergate was a vital issue, with far-reaching and dangerous ramifications. When an editor is right, as Bradlee was – and for a while he was alone in being right – it can change the journalistic landscape forever.

I attach as Appendix I to this essay an imaginary memo from the editor of a daily paper or newsmagazine to his or her news staff to help us think how this might be done in the case of the environment. Because such a memo must be specific, and must be lodged in the historical context of January, 2004, it will appear strangely flawed and inadequate – as in fact it is. It will be marvelously easy to criticize, especially for editors. But it helps to illuminate the difficulties and issues surrounding superior coverage of the drama of global environmental deterioration in a far more practical way than do glutinous generalizations.

Let us move to some Q & A based upon the call to this meeting.

Q: Is the public adequately informed on environmental and related economic issues?

A: There is no commonly accepted metric of "adequacy". The broad answer is no. If we mean by "the public" the population of the planet, perhaps only .5% of the world's citizens have some real sense of the immense stakes and danger inherent in the environmental drama.[3] If by the "public" we mean the American public, perhaps 5–10%, at a guess, of the 30 million Americans who follow public affairs with some regularity have a good sense of this issue. So none of these publics is adequately informed. An important corollary question is: how many of them want to be informed? Because the press does respond to market demand.

Q: How well are the news media explaining the importance and complexity of these issues, including the underlying science?

A: Again, the lack of a clear standard for deciding what is done "well" limits us. News organizations often cover micro-aspects of the macro-questions: a battle in Congress on a piece of environmental legislation, or a suit brought by an environmental organization against a polluter. By and large news organizations do not in their coverage relate environmental problems and dangers broadly to the present model of human economic activity. Just as news organizations did not, before 9/11, report on the challenge of terrorism and weapons of mass destruction as a pre-eminent and continuing danger to the human experience as we know it.

We have entered what I would call the "crunch". The days of the free ride, when human poking and digging and producing and experimenting made only marginal or reversible impacts on the only habitat we have ever known, are over. We have passed from the period of "environmental problems" into a race against an accelerating environmental crunch. And this the press is not reporting, and has not learned to how to report.[4]

Q: Can they [the press] be expected to distinguish between mainstream scientific views and outliers, or between disinterested scientists and advocates using science to support a position?

A: Yes. See Appendix I, described above.

Now let me add a question of my own.

Q: Should the press be skeptical about reporting the environmental challenge as one of the fundamental, distinguishing, and decisive strands of this period of history?

A: Yes, they should be very skeptical, and very cautious. News organizations are beset by advocates, evangelists, doomsayers and hucksters saying that their particular cause is the most critical one, that the danger against which they in particular warn is the ultimate one. They cannot all be right, and it is very safe and very comfortable ground for a journalist to lump them all in the same annoying category of apocalyptic zealots who bay relentlessly at their doors. So the root of disagreement here may be

> very deep, but very simple. If you do not believe a dangerous and intensifying process of man-caused environmental degradation on a global scale is underway, then you will find the way the press reports environmental issues today satisfactory or even alarmist. If you believe, as I do, that such a process is underway and that if not reversed it will have, over time, catastrophic consequences for the human adventure on this planet, then you will find that the press is not covering this as the enormous drama that it is. I submit that this is a deeper and more important question than the question of covering competing economic and environmental values.[5]

Seen in this light, what is happening is a drama of Greek-tragedy proportions. The dangers humans face are enormous and destructive – and at least now, beyond the ken of their collective ability to understand completely. And these dangers are, ultimately, caused by humans themselves. It is an archetypal pattern: man, blinded in his unknowing, bringing ruin upon himself. (It is in that sense alien to the American tradition, with its optimistic belief in "progress" and the ability of human ingenuity, hard work and determination at the individual level to prevail over adversity.)

But there is another aspect of the situation that is both a paradox and an opportunity. Unlike wars, tax breaks and natural disasters, the dynamics of this drama are very slow, unfolding in a context of decades. The pace is perhaps too slow to excite much human attention or provide the basis in crisis that humans often require to organize themselves for a new task. It is, however, slow enough to allow humans to adapt their systems of production and consumption gradually without immense disruption—if they start in time. And it is perhaps slow enough to allow time for the independent press to determine whether it is indeed a dramatic and fateful chapter in the human adventure, or merely another topical political issue among many.

Endnotes

1. I apologize for summarizing in a single colorless sentence one of the most dramatic and difficult transitions in human history, but it is not our present topic.

2. The Punjab, the Great North Plain of China, and the Great Plains of the North America.

3. The Pew Global Attitudes Project (2002, Pew Research Center for the People and the Press) serves up some fascinating nuggets on global attitudes toward the environment: 70% of Chinese surveyed thought pollution/environment was the "greatest danger to the world", making it for them the number one problem, while 44% of Canadians and 23% of Americans thought it was the "greatest danger".

4. As an example of first-rate, accessible reporting on a difficult subject by a reporter without a long background in environmental affairs, I attach as Appendix II an article providing background on the recent Senate vote on global warming that appeared recently in the Knoxville News Sentinel.

5. To those of you who would like a straightforward read that gives you in broad strokes the global environmental problem, I recommend Plan B by Lester Brown. (Plan B – Rescuing a Planet under Stress and a Civilization in Trouble, 2003, W. W. Norton & Co., ISBN 0-393-32523-7)

Appendix I

TO: News Staff

FROM: Executive Editor

SUBJ: The Environment

You have all seen over the past month the increased coverage we have started to give to environmental issues. Our readers and our competitors have noticed it as well.

I want to explain to you the decision we have taken and how it will affect our news coverage going forward.

Over the past six months a group of senior editors and reporters have met with nearly 100 scientists on global warming, degradation of the oceans, changes in the availability and quality of fresh water, and a host of other issues. Many of you have been involved in one or more of these meetings.

As you recall, we have heard scientists who portrayed these problems as serious and intensifying, and we heard scientists who challenged that view and argued that for the most part no significant damage was being done to the environment. In our business we are used to conflicting claims. But our examination of these claims and counter-claims, and the people making them, produced some astounding findings. Among them:

– The findings of those scientists who challenged the mainstream view that there was rapid environmental deterioration had, by and large, not been subject to rigorous peer review.

– The scientists who held that a dangerous and potentially catastrophic process was underway were, by and large, more experienced and more respected in their respective disciplines, as judged by longevity in their fields, their academic appointments, their publications, and their international awards (Nobel Prizes etc.). It was a little bit like inviting baseball experts in to present their views on hitting, and weighing the view of Gehrig, Cobb, Ruth, Ted Williams and other .300+ hitters against a group of .190 hitters. The views differed sharply, but it was very hard to accord equal weight to the two points of view.

– Most damaging of all, many of the scientists who questioned whether serious environmental deterioration was underway were in fact supported financially directly or indirectly by the coal and oil industries.

– Last of all, those who held that serious environmental degradation was underway were able to point to a body of scientific evidence growing in both size and robustness over two decades, whereas those who challenged that view were able to cite only a flurry of very recent findings—most of them, as noted above, not subject to rigorous peer review. And many of these findings were refuted in front of us, often devastatingly, as being based on scrambled, partial, or inaccurate data. The record of these panel discussions is available for those of you who wish to examine it.

Those of us who sat through all these discussions were, a little bit to our surprise, persuaded that there was indeed a process of environmental deterioration underway that was massive, dangerous, and in most respects intensifying, and that this poses a severe challenge, if not a fatal threat, to the present system of eco-

nomic production, consumption and energy generation on which our civilization relies. This is a story of larger significance and quite different proportions than the "environment" story as we and others have covered it in the past.

Here is how we will cover this story going forward.

We have created new beats in the areas of climate and air, water, agriculture, oceans and fisheries, and environmental impact on health. Those areas will be covered as parts of the larger race against time to find a workable balance between the requirements of the biosphere on one hand and the demands and means of human economic activity on the other.

We will cover the science, but we will go far beyond "Dr. Jones said the earth is round" but "Prof. Plotz said the earth is flat". We will cover all sides of the debate, but we will report also on the qualifications, background, past records and funding sources of scientific experts so that our readers can make their own judgments about their independence and credibility.

Many of the topics we are covering have significant international dimensions. We will report on those dimensions—they form a significant part of the story, and affect its import and dynamics. We count on you to find imaginative ways to do this. We all know that the appetite of our readers for international news is not exactly boundless. Experiment, try some new approaches—we will be blazing new ground here. This issue is going to be with us a long time, and it will require us to develop some new tools.

Learn your field inside out. We will expect you to be as knowledgeable about your area as most policy-makers, and to be familiar with the work of relevant scientists, advocacy groups, business interests, and governments. One of you who has volunteered for one of these new beats served for more than a decade one of our profession's most distinguished Congressional correspondents. As she knew the culture, the dynamics, the tribal traditions, the realities and the pretenses of the Congress, so we expect you to learn the insides of the EPA, leading environmental groups such as Environmental Defense, NRDC and World Wildlife Federation, the coal and gas lobbies, the big 5 oil companies, the population experts, etc. We intend to dominate as well as trailblaze in this area.

We are making this huge investment because upon close examination this story warrants it. The stakes are tremendous, the process of deterioration is well advanced but only spottily reported, and the story is not going away anytime soon. I want us to be first, and I want us to be best—for a long time to come.

The publisher understands and supports the magnitude of the effort we are undertaking. He feels this is one of a handful of issues that will shape our future. It turns out that he, like I, has grandchildren.

Appendix II

Year 2100 forecast: Scientists agree on climatic change, differ on severity

By Scott Barker, Knoxville News-Sentinel

October 26, 2003

By 2050, about the time today's college graduates are getting ready to retire, the summers likely will be getting hotter, the air muggier and the rains heavier than they are today.

Storms might come more often and be more intense as the years progress.

By the end of the century, the spruce-fir forest crowning the peaks of the Great Smoky Mountains, already ravaged by rapacious insects and acid rain, might be but a memory. Knoxville's climate could be roughly the same as today's climate in Tupelo, Miss.

Though predicting future climate patterns is an uncertain business, especially at the regional level, that's one of the more conservative scenarios participants in the U.S. Global Change Research Project and officials at the U.S. Environmental Protection Agency predict for East Tennessee if nothing is done to mitigate global climate change.

American and international researchers have reached a consensus on the role of industrialization in climate change, though consensus doesn't equal unanimity.

In its 2001 assessment, the Intergovernmental Panel of Climate Change, a worldwide network of 2,500 scientists sponsored by the United Nations, said there is "new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

In the front lines of climate change studies are researchers at Oak Ridge National Laboratory's Environmental Science Division.

"There's broad agreement that the burning of fossil fuel and deforestation are causes," Tom Wilbanks, a senior researcher in ORNL's Environmental Services Division.

The theory is simple, though the reality – especially predicting future events – is highly complex.

One of Wilbanks' colleagues at ORNL, T.J. Blasing, said climate scientists know that greenhouse gases have increased by about a third since the beginning of the industrial age.

"It's not the natural cycle of things. It's fossil fuel production and other things humans are doing that's causing it," Blasing said.

There are four primary greenhouse gases – carbon dioxide, methane, nitrous oxide and chlorofluorocarbons.

Greenhouse gases absorb infrared radiation and return a portion back to the earth. Greenhouse gases are necessary for life, since they keep the earth from becoming a barren chunk of rock and ice.

But many researchers warn that high concentrations of greenhouse gases could heat up the earth's atmosphere enough to alter the climate.

"We're sure the effect would be to warm the lowest levels of the atmosphere. How much it's going to warm is a matter of debate," Blasing said.

The U.N. points to several pieces of evidence indicating the climate is warming.

The 10 warmest years on record have occurred since 1987. The Arctic ice cover has shrunk by 10-15 percent since the 1950s during spring and summer. Ocean levels are rising and glaciers are retreating.

Temperatures in North America have risen about 1 degree Fahrenheit over the past century. Satellites and weather balloons show little temperature change across the entire globe, especially above the world's oceans.

ORNL is one of several research facilities running computer models of various climate change scenarios for the fourth international assessment on the possible effects of climate change.

John Drake and other ORNL researchers are concentrating on a scenario that describes low population growth coupled with a rapid transition toward an information and service economy.

Drake said the scenario assumes the use of cleaner energy sources, global solutions and equity between developing and developed countries. "That's one of the more optimistic scenarios," he said.

Even with emissions reductions, Drake said, carbon dioxide concentrations in the atmosphere wouldn't begin falling for 50 to 100 years.

"One of the fundamental chemical truths is (that) CO_2 in the atmosphere takes a certain amount of time to wash out," Drake said.

The fourth international assessment won't be complete until 2007. The only national assessment, published by the U.S. Global Change Research Program in 2001, included a section on climate change in the Southeast, though researchers caution that regional forecasts aren't as reliable as global predictions.

The British Hadley Centre Global Climate Model shows temperatures in the Southeast should rise a little more than 4 degrees Fahrenheit by 2090, with annual rainfalls increasing by 20 percent. The summer heat index could rise by as much as 15 degrees.

"You add that to summertime temperatures in East Tennessee, and that's hot. That's a kind of magnitude of change that shows this is something to worry about," Wilbanks said.

And the Hadley model, ORNL researchers say, is the most conservative tool used to predict climate change. A model developed by the Canadian Centre for Climate Modeling and Analysis forecasts a 10-degree increase in temperatures in the Southeast during the century.

According to the assessment, "environmental quality is expected to degrade slightly over the region over the next century."

For Tennessee, the silver lining is an expected boost in agriculture and hardwood forestry.

However, higher water temperatures could lower oxygen levels, concentrating pollutants and degrading water quality. According to the EPA, a warmer, wetter climate in Tennessee could expand the habitat for disease-carrying insects, increasing the potential spread of malaria, Lyme disease and dengue fever.

Smog, already a big problem in East Tennessee, would worsen increased temperatures, possibly leading to higher rates of respiratory disease and heat-related maladies.

"In the air quality arena," the assessment concludes, "the only effective strategy for improvement is in the reduction of emissions through the more efficient use of resources in the transportation and industrial sectors."

According to the EPA, carbon dioxide from power plants, vehicles and factories accounts for about 84 percent of all greenhouse gas emissions. The United States produces more greenhouse gases than any other nation.

There are dissenting voices, though. Some scientists accuse their brethren of politicizing pure research and needlessly alarming the public with dire predictions of worldwide doom. They dispute the notion that the buildup of greenhouse gases is responsible for the warming trend and contend that measures to limit emissions won't help.

Foremost among them is Richard Lindzen, a climate researcher at the Massachusetts Institute of Technology and a member of a National Academy of Sciences panel on climate change.

All that's known for certain, Lindzen says, is that the global mean temperature has risen, carbon dioxide concentrations are higher than in the past and greenhouse gases are likely to warm the earth.

"But – and I cannot stress this enough – we are not in a position to confidently attribute past climate change to carbon dioxide or to forecast what the climate will be in the future," he wrote in a 2001 opinion piece in the Wall Street Journal.

Reached via e-mail last week, Lindzen said his views haven't changed in the past two years.

Lindzen says the temperature increase during the 20th century isn't unusual and can't definitely be blamed on greenhouse gases.

He also says computer models lack precision to accurately model Earth's varied and dynamic climate. They can't be used to accurately predict current carbon dioxide levels, so, he reasons, they can't be trusted to forecast future climate changes.

Oak Ridge researchers counter that computer models are growing more sophisticated and the climate data more comprehensive every year. More powerful computers like ORNL's Cheetah, an IBM supercomputer capable of performing trillions of calculations per second, should improve precision.

Blasing points to work by Sydney Levitus and others at the National Oceanographic Data Center in Maryland showing that incorporating previously unavailable ocean temperature data into the models confirms that manmade greenhouse gases are affecting the climate.

Still, Wilbanks said, models don't predict the future so much as they offer a range of possible outcomes.

"The biggest problem with the models is that they talk about averages and not extremes," Wilbanks said, adding that knowing average temperatures doesn't help the farmer wanting to know when the first frost will come.

The models also can't predict sudden changes triggered by accumulated effects. For example, he said, researchers don't know how high temperatures would have to get to cause a dramatic change in course of the Gulf Stream, which moderates England's climate.

Some scientists in Oak Ridge and elsewhere have turned their attention to mitigating the effects of climate change. Reducing greenhouse gas emissions is only one option. Others include sequestration, which is the storing of carbon in the earth, and developing hydrogen power sources.

Dramatic breakthroughs are needed, Wilbanks said, because improving existing technologies and reducing emissions won't be sufficient.

"There are concerns," Wilbanks said, "that climate change, if it continues, could result in abrupt changes by the end of the century."

Forum Participants

Frank Edward Allen is president of the Institutes for Journalism & Natural Resources, a public-interest foundation dedicated to raising standards of news coverage for growth, development and the environment. He spent 14 years at *The Wall Street Journal* as a writer, a features editor, a bureau chief and the paper's first environment editor. He also has reported and edited for the E*ugene Register-Guard, the Associated Press*, the *Tucson Daily Citizen* and *The Minneapolis Star*. In 1994, he left *The Wall Street Journal* to become dean of the University of Montana's School of Journalism, where he shaped expedition-style learning programs for mid-career journalists that evolved into IJNR. He is the principal author of *Matching the Scenery: Journalism's Duty to the North American West*, a two-year study of shortcomings of the region's daily newspapers.

Jessica Hobby Catto is President of Crockett Street Management, an investment company; of Castle Peak Ranch; and of Elk Mountain Builders. She served as Vice Chairman of H&C Communications, a broadcasting company of network affiliated television stations. She is vice-chairman of Environmental Defense and serves on the boards of The Conservation Fund and the National Parks Conservation Association. She is a contributing editor of the American Journalism Review, and was its publisher from 1980 to 1987. President Clinton appointed her to the Advisory Board of the National Parks System in 1993. She has founded an annual conservation award presented through the Land Trust Alliance and The Conservation Fund for citizens who have done outstanding conservation work in their regions.

Mary A. Gade is a partner at Sonnenschein Nath & Rosenthal in Chicago. She previously served as Director of the Illinois Environmental Protection Agency (1991–99), and for 13 years at the U.S. EPA, most recently as Deputy Assistant Administrator for Solid Waste and Emergency Response. She was a founder of the Environmental Council of States (ECOS) and has served as its

Treasurer, Vice President and President. She also served as Chair of the Ozone Transport Assessment Group (OTAG), a 37-member organization of states. In 1997, she was recognized as Public Official of the Year by *Governing* magazine, and in 1998 she was one of ten women recognized by *Good Housekeeping* and the Rutgers University Eagleton Institute of Politics for achievement in government. She graduated from the University of Wisconsin-Madison and the Washington University School of Law.

Peter C. Goldmark, Jr. is Director, Climate and Air Program, at Environmental Defense. From 1998 to 2002 he was Chair and CEO of the *International Herald Tribune*. He previously served as President and CEO of the Rockefeller Foundation (1988-97); Senior Vice-President of the Times Mirror Corporation (1985-88); Executive Director of Port Authority of New York and New Jersey (1977–85); Director of the Budget, State of New York (1975–77); Secretary of Human Services, Commonwealth of Massachusetts (1971–74); and as history teacher, program analyst for the U.S. Office of Economic Opportunity, Assistant Director of Budget and Executive Assistant to the Mayor of New York (1962-70). He has served on numerous boards and commissions, including Lend Lease Corporation, Harvard, Knight Ridder Inc., and Dreyfus Third Century Mutual Fund. He has a B.A. in government from Harvard, *magna cum laude*.

Robert E. Grady is a Partner at the Carlyle Group, a global private equity firm, where he oversees Carlyle's venture capital arm. Since 1994, he also has taught a course on regulation at Stanford Business School. Before Carlyle, he was a Managing Director at the technology investment bank Robertson Stephens. He served in the White House under President George H.W. Bush as Associate Director of OMB, and then as OMB's top deputy and Deputy Assistant to the President. Previously, he was Chief Speechwriter for the 1988 Bush Campaign; Director of Communications for NJ Governor Thomas Kean; and Chief of Staff to Congresswoman Millicent Fenwick. He is a Trustee of Environmental Defense and is Chairman of the Board of Resources for the Future. He graduated from Harvard College and the Stanford Graduate School of Business.

Christine Gregoire is Attorney General of Washington. As lead negotiator for the states, she announced a settlement of lawsuits against the tobacco industry in 1998 that provides the largest financial settlement in history and mandates restrictions on advertising and youth marketing. As Director of the Department

of Ecology (1988–92), she negotiated the Tri-Party Agreement with the federal government for the cleanup and storage of radioactive wastes at the Hanford Nuclear Reservation. She served as a law clerk in the AG's Spokane Office (1976) and was appointed Assistant Attorney General (1977) and Deputy Attorney General (1982). She was President of the National Association of Attorneys General in 1999–2000. She has a teaching certificate from the University of Washington and a JD and an honorary LLD from Gonzaga University. She and her husband Michael have two daughters.

Gary S. Guzy is Senior Vice President and National Environmental Business Development Leader of Marsh USA. He served as General Counsel of the U.S. Environmental Protection Agency, the agency's chief legal officer, during the Clinton Administration and held other senior EPA positions. He has also served as a partner with the law firm of Foley Hoag LLP, a Visiting Scholar at the Environmental Law Institute, and a Senior Attorney with the U.S. Department of Justice's Environment and Natural Resources Division. He graduated from Cornell University (magna cum laude) and Cornell Law School (cum laude) and clerked for the Honorable Elbert P. Tuttle, Senior Judge of the U.S. Court of Appeals for the Eleventh Circuit in Atlanta.

Samuel L. Hayes III is Jacob H. Schiff Professor of Investment Banking Emeritus at the Harvard Graduate School of Business, where he has taught since 1972. He previously taught at the Columbia Graduate School of Business. He is a member of the boards of Tiffany & Company; Eaton-Vance Funds; Kobrick Funds; Telect, Inc.; Swarthmore College, where he chairs the Investment Committee; and the New England Conservatory, where he chairs the Finance Committee. He is the author of numerous articles and books, including Managing Financial Institutions (1992) and *Islamic Law and Finance: Religion, Risk and Reward* (1998). He has a B.A. from Swarthmore and an M.B.A. (with distinction) and a D.B.A. from Harvard.

Barbara J. Krumsiek has been President, CEO, and Co-Chairperson of Calvert Group, Ltd since 1997. She previously spent 23 years with Alliance Capital Management, where she served as Senior Vice President and Managing Director for the mutual funds division. In 2001 she was named "Outstanding CEO of the Year" by the Women's Business Center of Washington DC. She serves on the Executive Committee of the Greater Washington Board of Trade; the Boards of

the Eugene & Agnes E. Meyer Foundation, the Trickle Up Foundation, and the Women's Economic Roundtable; the Board of Visitors for the Howard University School of Law; and the Advisory Counsel to the United Nations Global Compact. She has a bachelor's degree from Douglass College, Rutgers University, and a masters from New York University, both in mathematics, and an honorary Doctor of Humane Letters from Georgetown.

Frank E. Loy was Undersecretary of State for Global Affairs and chief U.S. negotiator on climate change from 1998 to January, 2001. He has served as Director of the Bureau of Refugee Programs and as Deputy Assistant Secretary for Economic Affairs, as President of Penn Central, as Senior Vice President for International Affairs of Pan American Airways, as a corporation lawyer with O'Melveny & Myers, and as President of The German Marshall Fund of the U.S. He has also been chairman of the Environmental Defense Fund and the League of Conservation Voters.

William E. Mayer formed Park Avenue Equity Partners in 1999, a private equity fund, which invests in mid-size companies. He was a founding partner of Development Capital in 1996, which invested in private and public companies. From the fall of 1992 until December 1996, he was a professor and Dean of the College of Business and management at the University of Maryland. He worked at The First Boston Corporation (now Credit Suisse First Boston) for 23 years where he held numerous management positions including President and CEO. He currently is Chairman of the Board of the Aspen Institute, a trustee of Tulane University and the University of Maryland, and a member of the boards of a number of public and private companies.

W. Henson Moore is President and CEO of the American Forest & Paper Association (AF&PA) and President of the International Council of Forest and Paper Associations. Previously he served as Deputy Secretary of Energy (1989–92) and Deputy Chief of Staff for President George Bush (1992). He represented Louisiana in Congress (1975–87), serving on the Energy and Commerce, Agriculture, Budget, and Ways and Means Committees. Immediately prior to joining AF&PA, he was a partner in the Washington office of Bracewell & Patterson, a Houston law firm. He served in the U.S. Army in Germany and holds B.A. and M.A.

degrees in government and a law degree from Louisiana State University. He and his wife, the former Carolyn Ann Cherry, have three grown children.

Steven W. Percy is former Chairman and CEO of BP America (1996–99), and President of BP Oil in the U.S. (1992–96). He previously served in London as Group Treasurer of BP and Chief Executive of BP Finance International. After retiring from BP he served as head of Phillips Petroleum's Refining, Marketing and Transportation Company and is now Visiting Professor at the University of Michigan Graduate School of Business. He served on President Clinton's Council on Sustainable Development and as Co-Chair of its Climate Change Task Force. He is Non-executive Chairman of Wavefront Energy and Environmental Services and on the boards of Omnova Solutions, Resources for the Future, and Junior Achievement International. He earned a BS in Mechanical Engineering from Rensselaer Polytechnic Institute, an MBA from the University of Michigan and a JD from Cleveland Marshall College of Law.

Paul R. Portney is a Senior Fellow at and President of Resources for the Future (RFF), where he has worked since 1972. From 1977–79 he was a visiting professor at U.C.–Berkeley's Graduate School of Public Policy. In 1979–80 he was Chief Economist at the Council on Environmental Quality in the Executive Office of the President. From 1992–95 he taught part-time, offering a course on environmental economics and policy at Princeton's Woodrow Wilson School. He is a member of the Sustainable Forestry Board, the board of directors of the Johnson Foundation, and a member of the Advisory Board to the Comptroller General of the United States.

John A. Riggs is Executive Director of the Program on Energy, the Environment, and the Economy at The Aspen Institute. From 1993 to 1995 he was Principal Deputy Assistant Secretary and then Acting Assistant Secretary for Policy and International Affairs at the Department of Energy, and he served for 20 years on the staff of the U.S. Congress, including 13 years as staff director of the House Subcommittee on Energy and Power. He also served in Vietnam and Brazil with the Agency for International Development and has taught energy policy at the University of Pennsylvania. He has a B.A. from Swarthmore College, where he is a member of the Board, and a masters in public policy from Princeton.

James E. Rogers is Chairman, President and CEO of Cinergy Corp., which serves 1.5 million electric and 500,000 gas customers in Ohio, Indiana, and Kentucky and owns over 13,000 megawatts of generation. He served as Vice Chairman, President and COO of Cinergy from 1994 to 1995 and was named CEO in 1995 and Chairman in 2000. Prior to the formation of Cinergy, he was Chairman, President and CEO of PSI Energy, Inc. Previously he was Executive Vice President of Enron; a partner in Akin, Gump, Strauss, Hauer & Feld; Deputy General Counsel for Liti-gation and Enforcement of the FERC; Law Clerk for the Supreme Court of Kentucky, and Assistant Attorney General for Kentucky. He attended Emory University and holds B.B.A. and J.D. degrees from the University of Kentucky and an honorary Doctor of Law degree from Indiana State University.

George A. Schreiber, Jr. is a Managing Director of Credit Suisse First Boston and Co-Chairman of the Global Energy Group. Prior to joining CSFB in 1999, he was President of Pinnacle West Capital Corporation, a diversified energy holding company with over US$7 billion in assets. He was also Chief Financial Officer and a member of the Board of Directors of both Pinnacle West and Arizona Public Service. A substantial portion of his career has been in the investment banking business involving all areas of finance including mergers and acquisitions, restructurings, bankruptcy reorganizations, leasing, project finance and other capital markets transactions in the domestic and international markets. He received a B.S. in 1970 and a M.B.A. in 1971, both from Arizona State University.

Robert N. Stavins is Albert Pratt Professor of Business and Government, Chairman of the Environment and Natural Resources Faculty Group at the Kennedy School, and Director of the Environmental Economics Program at Harvard. He is a member of the EPA Science Advisory Board, the Resources for the Future Board, the Intergovernmental Panel on Climate Change (IPCC), and the Board of Academic Advisors of the AEI-Brookings Joint Center for Regulatory Studies. Previously he directed Project 88, co-chaired by former Senator Timothy Wirth and the late Senator John Heinz, to develop innovative approaches to environmental problems; was an economist at the Environmental Defense Fund; managed irrigation development in the Middle East; and served in the Peace Corps in West Africa. He holds a B.A. in philosophy from Northwestern, an M.S. in agricultural economics from Cornell, and a Ph.D. in economics from Harvard.

Vijay V. Vaitheeswaran is the global Environment & Energy Correspondent for *The Economist*. He has covered the politics, economics, business and technology involved in those topics since 1998. He is based in New York City. He joined the staff as the London-based Latin America Correspondent in 1992. Two years later, he opened the magazine's first bureau in that region in Mexico City, returning to London in 1997. Previously he worked in brand management at Procter & Gamble. He holds a degree in mechanical engineering from the Massachusetts Institute of Technology. His new book, *POWER TO THE PEOPLE: How the Coming Energy Revolution will Transform an Industry, Change our Lives, and Maybe Even Save the Planet*, is published by Farrar, Straus & Giroux. (www.vijaytothepeople.com)

Mark Van Putten is Principal of the environmental consulting firm of ConservationStrategy. Previously, he spent over 21 years on the staff of National Wildlife Federation – America's largest membership-based conservation organization – including seven years as President and CEO. He was also the founding director of NWF's Great Lakes regional office. He is a magna cum laude graduate of the University of Michigan Law School and has taught at the Law School and founded the school's Environmental Law Clinic. He has served on the U.S. Trade Representative's Trade & Environmental Policy Advisory Committee, was a credentialed participant in meetings of the World Trade organization, and was the keynote speaker at last year's hemispheric "water summit" in Mexico City. On the 30th anniversary of the Clean Water Act, he was named one of thirty "Clean Water Heroes."

Christine Todd Whitman served as Administrator of the Environmental Protection Agency from January 2001–June 2003. She served as the 50th Governor of New Jersey, from 1993 to 1999. Among the achievements during her time at EPA were the introduction of President Bush's Clear Skies Initiative; establishment of a watershed based approach to protecting lakes, streams, and rivers; passage of landmark brownfields legislation; an agreement to clean up the Hudson River; a State of the Environment Report; and a requirement for cleaner burning diesel engines for non-road vehicles. Prior to becoming governor, she headed the New Jersey Board of Public Utilities and the Somerset County Board of Freeholders. She has a B.A. from Wheaton College and is married to John R. Whitman. They have two children.

John Whitman is founder and President of Sycamore Management Corp., a global venture capital investment firm. Previously he was an advisor to Ford Motor Company, AT&T Venture Corp., the Hungarian-American Enterprise Fund, British and Commonwealth Holdings, Coopers & Lybrand, the U. S. Agency for International Development, and Prudential Securities. He was Chairman and CEO of Prudential-Bache Interfunding Inc. and held various positions at Citicorp, including Vice President of Citicorp Venture Capital; Vice President for Corporate Finance of Citicorp International Bank, and principal of Citicorp's corporate distressed loan department. He is on the boards of numerous corporations and the Liberty Science Center, an interactive learning center for the exploration of nature, science and technology. He was awarded Bronze Stars for valour and meritorious service in Vietnam. He graduated from Yale and received his M.B.A. from Harvard Business School.

SELECTED PUBLICATIONS

PROGRAM ON ENERGY, THE ENVIRONMENT AND THE ECONOMY

A Climate Policy Framework: Balancing Policy and Politics

The Aspen Institute, in association with the Pew Center on Global Climate Change, convened a diverse group of leaders to develop a politically feasible framework for a mandatory U.S. climate change policy. Co-chaired by Eileen Claussen and Robert W. Fri, the group did not discuss whether mandatory action is now warranted. It did, however, reach consensus on several fundamental elements of a national policy, if one is adopted.

2004. 100 pages, ISBN# 089843-397-5, $12 per copy

Electricity Restructuring

The 2003 Energy Policy Forum focused on electricity restructuring. Chaired by former Director of Central Intelligence and Undersecretary of Energy John Deutch, participants discussed the advantages and disadvantages of national rules governing transmission, economic and market power issues affecting ownership, whether the market's choice of fuel is in the national interest, whether natural gas supplies are adequate, and how restructuring will affect the future of nuclear power, renewables, efficiency, and distributed generation. A series of *Electricity Recommendations* were sent to Congressional and Administration leaders following the Forum.

2003. 55 pages, ISBN#: 0-89843-389-4, $8 per copy.

U.S. Policy on Climate Change: What Next?

Following U.S. withdrawal from the Kyoto Protocol, the Aspen Institute invited a distinguished group of scientists, business leaders, and environmental experts to discuss what the U.S. should do next. The non-technical discussion papers provide useful background and innovative policy suggestions. Forum co-chairs Frank Loy, Undersecretary of State under President Clinton, and Bruce Smart, Undersecretary of Commerce under President Reagan, summarize the discussion and the Forum's conclusions in a compelling introductory essay. The group concluded that the U.S. government

needs to send a signal now that carbon emissions will have a cost in the future. Editor, John A. Riggs.

2002. 200 pages, ISBN# 0-89843-344-4, $16 per copy.

Vulnerability and Resilience

The 2002 Aspen Energy Policy Forum convened at a time of heightened urgency regarding energy vulnerability and resilience. The recent California crisis, the increasing volatility of oil and gas prices, and the sudden collapse of Enron and other energy companies focused attention on the nation's enduring energy problems. In addition, the events of September 11, 2001, raised a host of new questions about the vulnerability of energy systems and moved the threat of terrorism to the top of the list of energy challenges. The Forum, chaired by former Senator J. Bennett Johnston, addressed the question of energy vulnerability and resilience in the context of four key issues: the development of the energy systems of the future; the evolving geopolitics of energy; the reduction of America's reliance on oil; and the creation of a resilient electricity industry. Rapporteur, Paul Runci.

2002. 51 pages, ISBN# 0-89843-366-5, $8 per copy.

Dam Removal: A New Option for a New Century

This report offers a series of recommendations and practical advice to make it easier to integrate the consideration of dam removal into river management decisions, and to evaluate fairly and, if appropriate, to implement dam removal effectively. It is the product of a two-year dialogue among a group of people who represent a wide range of interests and disciplines. The imprimatur of this diverse group, with interests that are often at odds, lends a unique weight to the wide-ranging and practical recommendations.

2002. 68 pages, ISBN# 0-89843-360-6, $12 per copy.

U.S. Policy and the Global Environment: Memos to the President

Prior to the 2000 election the Aspen Institute convened a distinguished group of leaders as a hypothetical committee to advise the new President on global environmental policy. Experts prepared this set of policy memos to tell the President, concisely and in understandable language, "what he should know" and "what he should do" about climate change, biodiversity, population, oceans, water, food and agriculture, and other problems. A thematic summary of the group's conclusions, written by co-chairs Donald Kennedy of Stanford University and Roger Sant of the AES Corporation, communicates the urgency of the challenges, the complexity of the interrelated issues, and the optimism necessary to tackle them. Editors, Donald Kennedy and John A. Riggs.

2000. 220 pages, ISBN#0-89843-303-7, $16 per copy.

The Mexico-US Border Environment and Economy: A Call to Action to Make the Mexico-US Border Region a Model of Bi-National Cooperation for Sustainability

Co-sponsored by the Aspen Institute Program on Energy, the Environment and the Economy, and the Leadership for Environment and Development (LEAD), Mexico, participants in the Mexico-US Border Dialogue convened in Aspen in October 1999. In this report, available in English or Spanish, the group calls on then-Presidents Zedillo and Clinton as well as the 2000 presidential candidates in both Mexico and the U.S. to take major bi-national action necessary to ensure the environmental and economic health of the border region.

2000. 159 pages, ISBN# 0-89843-287-3, $8 per copy.

Uncovering Value: Integrating Environmental and Financial Performance

A potentially powerful trend is developing in the business and financial world. By learning to "value the environment," companies and financial institutions are uncovering another competitive edge. As communication of the business value of environmental considerations improves in quality and quantity, market forces will increasingly drive environmental progress and environmental opportunities will more directly drive strategic business planning.

1998. 37 pages, ISBN# 0-89843-254-5, $8 per copy.

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