
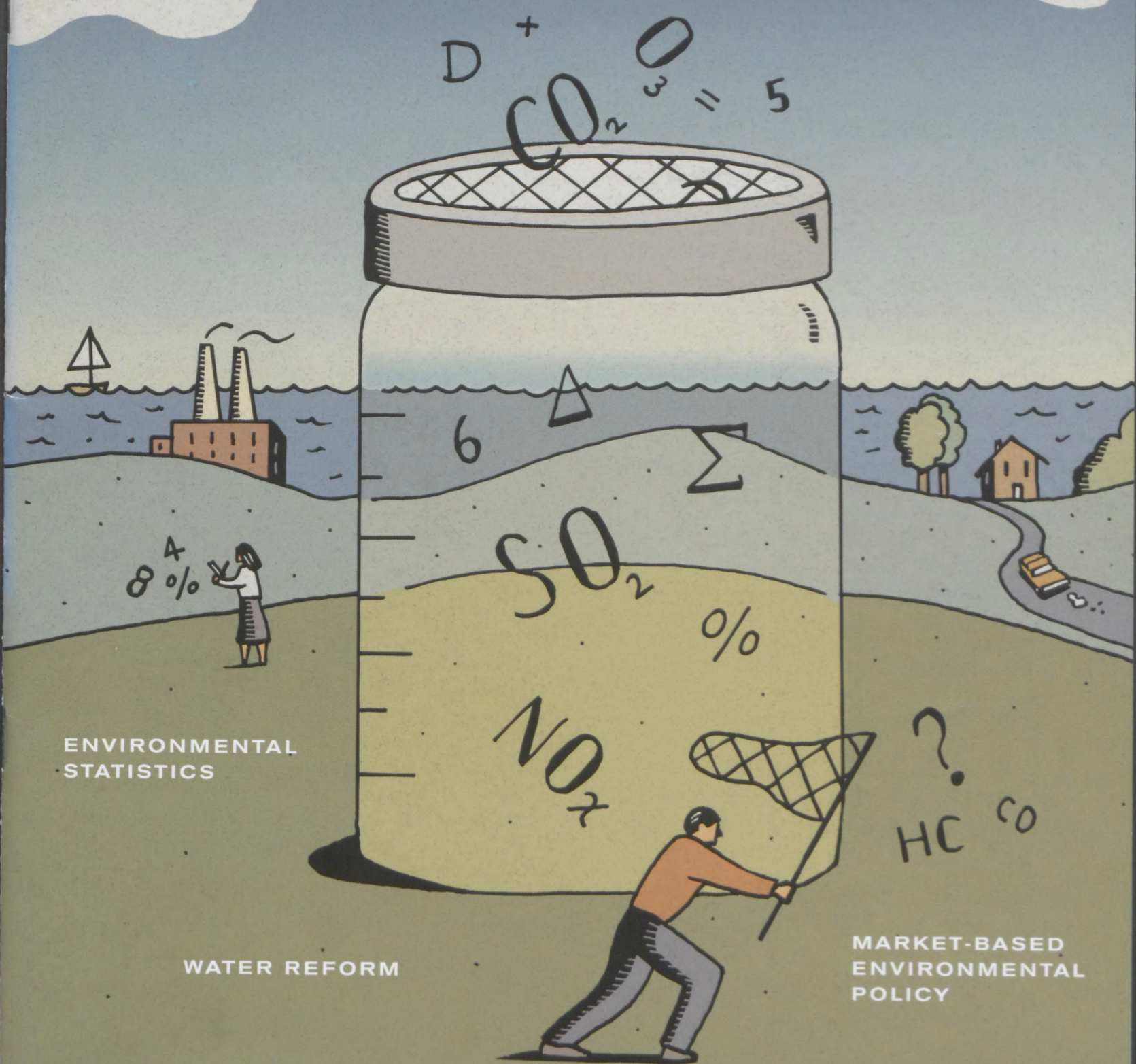


# RESOURCES

RESOURCES FOR THE FUTURE  SUMMER 2003 · ISSUE NUMBER 151



ENVIRONMENTAL  
STATISTICS

WATER REFORM

MARKET-BASED  
ENVIRONMENTAL  
POLICY

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PAUL R. PORTNEY

## “Capital on Two Feet”

If my calculations are correct, you are reading this in late September, as this country’s colleges and universities are filling up with new and returning students. But I wrote this message in mid-August, a time when 16 of the best of these undergraduate and graduate students were completing summer internships at RFF. Working closely with one of them, and observing the rest as best I could, gives me great hope for the future.

When economists talk about “capital,” most people think about financial capital—money that is lent to businesses for new plants and equipment, as well as the purchase and installation of information technologies, as well as to households in the form of mortgage or student loans, or other kinds of debt. Governments borrow financial capital, as well, to cover capital (and sometimes even operating) expenses; in fact, both the federal government and many state governments will be borrowing lots of money in the next several years because of the large deficits they are running.

Those of us interested in the environment often speak of another very important kind of capital—let’s call it natural capital, including that in the many national parks and wilderness areas, national forests, grass fields and wetland areas, scenic rivers and seashores. This capital, too, is essential to a balanced life, though decisions about its use often pit it against traditional commercial development. Perhaps the greatest contribution of the late John Krutilla, one of RFF’s founding fathers, was to show the economic value of natural capital left in its undisturbed state (see the story about Krutilla on page 2). Working with a number of outstanding young natural resource economists, including Kerry Smith, Tony Fisher, and Charles Cicchetti, Krutilla developed a methodology for attributing value to wilderness areas and a way to implement it empirically. Sometimes it showed that preservation trumped development, and sometimes not. But it made such economic comparisons possible where before they were not.

Critical as they are, though, money available for investment and the natural wonders alluded to above are not the only forms of capital. Indeed, what economists have come to call “human capital,” the kind that walks around on two feet, is also essential to economic growth and environmental protection.

RFF’s summer interns along with our research assistants—indeed, young people everywhere striving to learn and make the world a better place—may be the most important kind of capital anywhere. Here, of course, they help busy researchers open up new areas of inquiry, collect and analyze data, and occasionally co-author papers with them. Generally, they amaze us with their intelligence, excellent training, and boundless energy. It is not unusual to hear someone who has been here at RFF for some time say, “Boy, am I glad I don’t have to compete for a job against these guys!” That’s certainly how I feel, anyway.

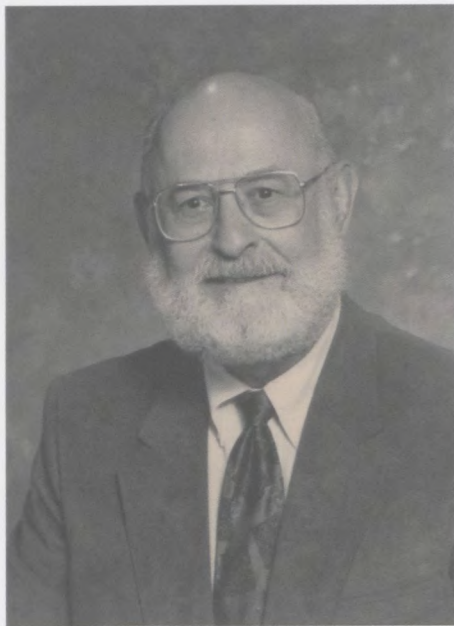
In addition to the leverage they provide to researchers, these young people provide something even more valuable—hope for the future. When the news of the day discourages—be it a fragile electrical grid, an electoral debacle in the nation’s largest state, or a peace that is much harder to win than the war that preceded it—our interns and research assistants remind us that there are bright young folks out there eager to solve these problems and the others that will arise after them. While collectively they get much less attention than the occasional “rotten apple,” they are more numerous and much more powerful.

We at RFF look forward to more human capital walking in our door next summer. And if you’ll be in Washington any time soon, feel free to walk in the same door to visit RFF. Thanks for your interest in and support for our work. ■

*Paul R. Portney*

## IN APPRECIATION

### JOHN V. KRUTILLA, 1922–2003



**R**esources for the Future (RFF) recently bid a sad farewell to one of its founding fathers—one of the creators of the modern theory of resource conservation—John V. Krutilla.

Friends and colleagues remember Krutilla as a wise and vigorous man, who passionately loved nature and the study of economics. The impact of Krutilla's theories on environmental preservation and economics can hardly be overstated. With the publication of his landmark research paper, "Conservation Reconsidered" (*American Economic Review*, Vol. 67, 1967), Krutilla laid the intellectual cornerstone of what today is an international discipline that is central to the assessment and protection of the environment. Over the course of his career, he fundamentally altered the global debate regarding comparisons and choices—both private and public—about the varied uses for undisturbed wild rivers, species, and other natural resources.

Instrumental in establishing the Association of Environmental and Resource Economists (AERE) in 1979, Krutilla received a Ph.D. in Economics from Harvard University in 1952 and an Honorary Doctor of Laws degree from Reed College. He was a central figure at RFF from 1955 through 1988 and served as the president of AERE in 1980. He received the association's Presidential Citation

in 1981 and the association's Distinguished Service Award in 1987. He was awarded (along with Allen Kneese) the inaugural Volvo Environment Prize in 1990.

#### **Innovative Thinker**

Krutilla broke new ground by proposing that natural resources have economic values, even when left undisturbed. This idea was contrary to popular thinking at the time, which focused only on the value of goods and services drawn from the natural environment if developed. Krutilla, for the first time, defined an approach to measuring the economic value of undisturbed natural environments.

Krutilla identified undisturbed natural environments as natural assets and defined an approach to measuring their economic value. In an important additional insight, he recognized that the possibility of irreversible changes to these natural resources as a result of actions taken by man—for example, the permanent removal of a wetland as a result of a housing development—required a new approach to economic analysis. In situations where the resources were unique and where there was some chance that society would not appreciate their full value at the time the decisions were made, his framework suggested that conventional practice had to be amended.

## *Putting economics to work on environmental issues is not so hard, once you see that it can be done, and how to get started. That was John Krutilla's key insight and great achievement.*

ROBERT M. SOLOW

Krutilla's theories transformed environmental policy analysis. They not only provided a sound economic basis for including preservation benefits as legitimate components of the policy calculus, they also defined the research agenda for a generation of environmental economists.

### **Prized Colleague**

Krutilla's influence was, in large part, the result of the infectious quality of his ideas. He collaborated with, and was greatly admired by, a number of the nation's leading economists. Kenneth Arrow, Nobel Laureate in Economics and Professor of Economics, Emeritus, at Stanford University, describes Krutilla as a pioneer. "The strength and staying power of his work is due both to its firm grounding in economic theory and to its recognition that the problems of the environment require creativity in economic analysis," Arrow said.

Another of the profession's leading lights, Robert M. Solow, Nobel Laureate in Economics and the Institute Professor of Economics, Emeritus, at the Massachusetts Institute of Technology, believes Krutilla's contributions to natural resource economics stemmed from his unusual passion for both economics and nature, combined with a clear vision. "Putting economics to work on environmental issues is not so hard, once

you see that it can be done, and how to get started," Solow said. "That was John Krutilla's key insight and great achievement. His 1967 article had such tremendous leverage because it showed economists how to think about natural assets, and apply what they knew in this important new context. That was the work of someone who understood economics deeply, and loved nature deeply. We, and not only we, are all in his debt."

Scholars at RFF were greatly influenced by Krutilla's research during the more than three decades he worked at the organization. "Those who care about the environment and see it as a public resource owe an immense debt of gratitude to John Krutilla for teaching us how to think about the economics of resource conservation," said Paul Portney, president of RFF. "Nearly all modern discussions about the value of preserving wilderness areas have their intellectual roots in Krutilla's writings. His ideas provide an irreversible legacy for the theory and the practice of resource and environmental policy."

### **Mentor to Many**

A supportive and insightful advisor, Krutilla nurtured many of the first generation of environmental economists. Charles Cicchetti, V. Kerry Smith, Gardner Brown, Anthony Fisher, A. Myrick Freeman III, and Robert Haveman,

among many others, all acknowledge that it was Krutilla's work and his subsequent encouragement at early stages in their careers that transformed their views about the domain and power of economic analysis. Those fortunate enough to have been part of his research program also joined his professional family.

### **A Lasting Legacy**

V. Kerry Smith, University Distinguished Professor, North Carolina State University, describes his late colleague's ideas as powerful forces in the development of both the theory and the practice of resource and environmental economics. "Philosophers remind us that intellectual life is a conversation linking the present to both past scholars and those to come," Smith said. "Sometimes it is a crowded field with many competing conversations. The power of some people's ideas captures the attention of their generation and those to come. This was certainly the case for John Krutilla. His work will remain a continuing part of all the important conversations about resource conservation and the human condition for the foreseeable future." ■

*For more information on John Krutilla's life and lasting contributions to the field of resource economics, visit [www.rff.org/johnkrutilla.htm](http://www.rff.org/johnkrutilla.htm).*

### RFF Report Studies Intersection of Transportation and Air Quality Planning

Peter Nelson

At the time of this writing, Congress is in the midst of the daunting task of reauthorizing its national transportation-funding program, known as the Transportation Equity Act for the 21st Century (TEA-21). The Bush administration's draft bill (called SAFETEA) has already generated criticism in Congress, particularly concerning its overall funding, which some argue is insufficient for America's transportation needs. But it's not just funding that promises to be controversial. One of the biggest battles is shaping up over provisions that affect what is called transportation conformity regulation, which governs the relationship between planning and air quality goals.

Although the general public is blissfully unaware of transportation conformity, it plays a central role in metropolitan planning. The goal of the conformity regulation is to embed air quality considerations in transportation decisions. Simply put, conformity requires that regional transportation plans in air quality nonattainment and maintenance areas be consistent with the relevant state air quality plan (the "SIP"). Through a *conformity determination*, transportation planners ensure that projected emissions from cars, pickup trucks, buses, and the like do not exceed the emissions budget specified in the SIP. If a metropolitan area's conformity determination expires and

the area is unable to make a new one, it is in a conformity lapse, and only a limited set of new projects (such as safety improvements) may proceed.

Although this may seem like a reasonable enough requirement, many argue that the conformity process has become unnecessarily disruptive to both transportation and air quality planning. In particular, many transportation planners argue that conformity places large administrative burdens on metropolitan planning organizations and saddles them with problems that are better handled by state air quality agencies or the federal government.

To examine the validity of these complaints, I worked with my colleagues Winston Harrington and Alan J. Krupnick from RFF, Arnold Howitt and Jonathan Makler from Harvard, and Sarah J. Siwek of Sarah J. Siwek and Associates on case studies of the experience of six metropolitan areas with the conformity process. In the course of the project, we conducted interviews with representatives of local metropolitan planning organizations, state air quality agencies, state transportation departments, the U.S. Environmental Protection Agency, Federal Highway Administration, and local citizens' groups.

It is difficult to summarize all the findings of our report in the short space here, but we found evidence to bolster the arguments of both critics

and supporters of the current conformity regulation. For example, we found some justification for complaints from many transportation planners about the apples-and-oranges problem that occurs when conformity determinations must be based on planning assumptions that were not used in the development of the SIP. On the other hand, another complaint—that the time horizon required for conformity is too long—did not prove to be a major issue.

Although there are many ways to skin the conformity cat, what is perhaps the best approach remains off the transportation radar screen. Studies of the costs of motor-vehicle use show, almost unanimously, that social costs, such as congestion and air pollution, greatly exceed the private costs. Unfortunately, governments have shied away from the obvious remedy, correcting this imbalance through a gas-tax increase or road pricing.

A major focus of RFF's transportation research is the analysis of various incentive policies directed at vehicle use. For example, Ian Parry (with Kenneth Small) recently estimated the optimal level for the U.S. gasoline tax. In addition, Elena Safirova, Kenneth Gillingham, Winston Harrington, and I have developed a strategic transportation model of the Washington, DC, region, which we are using to evaluate policies like high-occupancy toll lanes, increased parking fees, and a cordon system similar to the one recently implemented in London. Such policies are not exactly popular, and one of the greatest unsolved problems of transportation policy analysis is devising a politically acceptable, incentive-based program to deal with the social costs of driving.

*Exhausting Options: Assessing SIP-Conformity Interactions* can be found on the RFF website, at [www.rff.org/reports/2003.htm](http://www.rff.org/reports/2003.htm). ■

## RFF Workshop Explores Learning- by-Doing in Energy Technologies

To further understand the role learning-by-doing (LBD) plays in the development and adoption of renewable energy technologies, RFF organized a workshop in June to “learn-by-discussing.”

The workshop, funded by the William and Flora Hewlett Foundation and the Energy Foundation, brought together scientists, engineers, economists, and others involved in renewable energy development. It began with an overview of LBD and the role public policy can play to encourage it. Workshop participants then discussed LBD in the context of photovoltaics, wind power, and fuel cells.

“The LBD discussion has tended to be abstract and rather academic, but we wanted to be concrete and look at specific public policies as they relate to these three technologies,” said RFF Senior Fellow Raymond Kopp. “The issue boils down to what role the government should play in advancing the development and

adoption of these technologies, and how one decides which particular technologies to support.

### LBD and Public Policy

T.P. Wright used the expression “learning curve” in 1936 when studying airplane manufacturing: as workers gained more experience, their skills improved, which in turn lowered labor costs and benefited production. Kenneth Arrow applied the concept to economic thought in the 1960s, coining the term “learning-by-doing.” LBD contributes to a falling cost curve when acquired knowledge results in increased production.

Consequently, some advocates feel the government should help create or increase demand in the initial stages of new technology development. For example, if LBD lowers costs as more fuel or solar cells are produced, they contend, more consumers would choose these renewable technologies.

Several presenters pointed to the difficulty in quantifying LBD’s effects. John Holdren, director of the Science, Technology, and Public Policy Program at Harvard’s John F. Kennedy School of Government, recognized that learning-by-doing is an important part of innovation, but not well understood in terms of when and how it helps. “These deficits in understanding imperil effective policymaking,” he said. Without fully understanding

how incentives contribute to energy innovation, he added, “We can’t even say ‘how much is enough.’”

### LBD and Three Technologies

The sessions on photovoltaics, wind power, and fuel cells began with experts explaining each technology and the potential of LBD to lower its cost. Social scientists responded and analyzed the policy implications.

To Richard Duke, a McKinsey & Company consultant, photovoltaic cells, which use sunlight to produce electricity, are a high priority for public subsidy. He used five criteria to justify this, including public benefits and low market risk from substitutes. Ian Sue Wing, from Boston University’s Center for Energy and Environmental Policy, questioned whether LBD could indeed lower consumer costs enough to justify public expense.

Wind power, a more mature technology, has benefited from government support, according to Duke and Robert Williams of the Princeton Environmental Institute. Henry Jacoby, of the Massachusetts Institute of Technology, feels that more work needs to be done to predict its commercial future.

Frederick Panik, with Daimler Chrysler, reported that fuel cells have declined in price through the knowledge gained in successive generations of the technology. He felt public-private partnerships were key to solving issues that could lower costs further.

### “Learning by Synthesizing”

RFF’s Kopp, Richard Newell, and William Pizer are preparing a synthesis, available later this year, which will delineate common themes and areas of consensus. The agenda, participant list, and most of the presentations are currently available at [www.rff.org/lbd/home.htm](http://www.rff.org/lbd/home.htm). ■



# Accounting for the Environment

Spencer Banzhaf

Recently, Rep. Doug Ose (R-CA) proposed legislation (the “Department of Environmental Protection Act”) that would elevate the U.S. Environmental Protection Agency (EPA) to a cabinet department and create within it a Bureau of Environmental Statistics (or BES). While cabinet status for EPA may have symbolic or organizational advantages, the creation of a BES could prove to be the most meaningful portion of the bill—and an important development for future environmental policymaking.

The Ose bill would authorize the proposed BES to collect, compile, analyze, and publish “a comprehensive set of environmental quality and related public health, economic, and statistical data for determining environmental quality...including assessing ambient conditions and trends.”

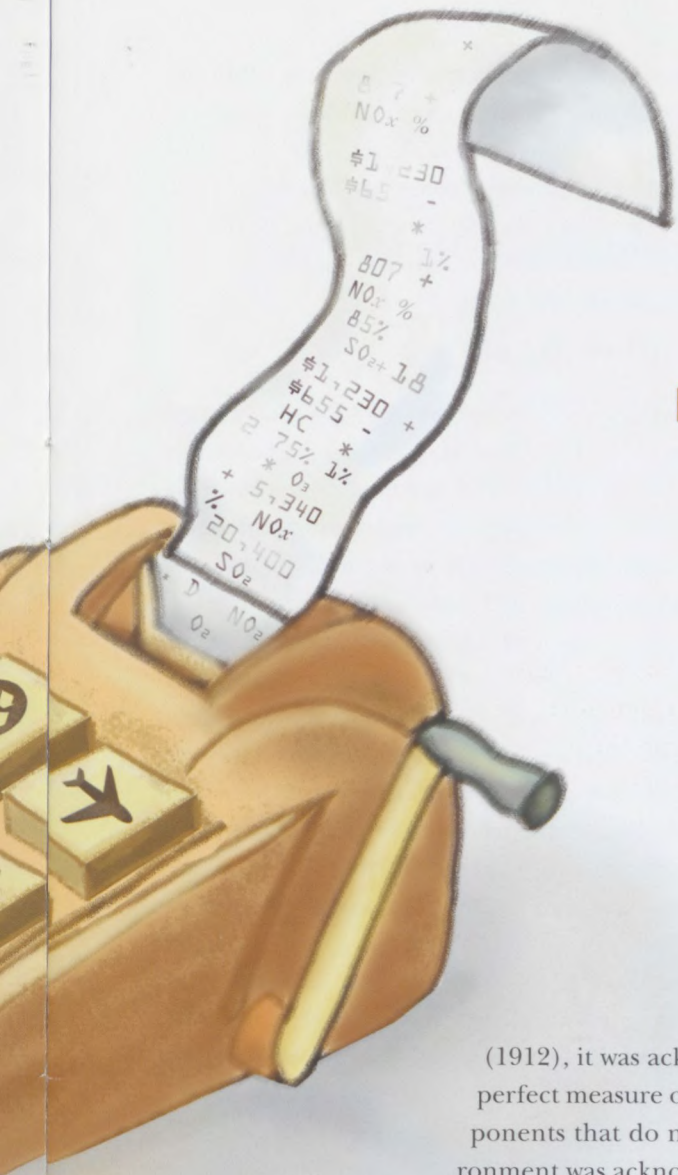
Why do we need another bureaucratic agency collecting statistics? The overarching reason is that we simply do not have an adequate understanding of the state of our environment. In many cases, the network of monitors measuring environmental quality is insufficient in geographic scope. For example, in many cases our knowledge of national air quality is based on a few monitors per state; our knowledge of water quality is even weaker. The measures we do have typically focus on potential problem areas—a sensible approach from the standpoint of enforcement, but not for surveying the overall state of things. Accordingly, we must make inferences about overall quality from observations at these trouble spots. The consequence is a biased understanding of environmental quality.

Of course, this easy answer begs the further question of why we need a better understanding of the state of our environment. There are several good reasons.

First, we have a natural desire to understand broad trends that affect our society and its welfare. Indeed, it is for this reason that we first began to collect many of our national economic statistics, including the familiar measures of gross domestic product (GDP) and inflation. Yet from the origins of GDP accounting, in A.C. Pigou’s seminal *Wealth and Welfare*







**But the knowledge gap about our environment is more significant than a mere shortage of beans for bean counters. It manifests itself in every stage of policy design and evaluation.**

(1912), it was acknowledged that GDP is only a proxy and not a perfect measure of welfare because it omits many important components that do not pass through markets. Even then, the environment was acknowledged to be one of the important omissions. Since that time, we have invested enormous resources in improving measures of the market components of national well-being, but we have not proportionately broadened that effort to other components, like the environment. It is time to do so.

Second, our ability to design effective policies to balance environmental quality with other objectives, or to attain environmental objectives in the most efficient and effective manner, is hampered by inadequate information. As professional social scientists, we at RFF would probably always want more data to analyze. But the knowledge gap is more significant than a mere shortage of beans for bean counters. It manifests itself in every stage of policy design and evaluation.

Looking in the rearview mirror, in many cases we do not know whether existing policies have been effective, making it difficult to assess what remains to be done. Looking forward, we often find that the playbook of strategies with which one might attack environmental problems is limited by lack of information. Sometimes, the lack of information creates practical problems for implementing and enforcing a strategy. For example, it is difficult to imagine a serious effort to manage the total maximum daily load of pollutants into our nation's watersheds, as EPA has proposed, without more complete data about pollution loadings and their sources. At other times, the lack of information makes it difficult to anticipate the effects of a policy, creating political uncertainties. For example, the cap-and-trade system, proven to be a highly cost-effective way to reduce air pollution nationally, may allow re-

maining pollution to concentrate in particular areas. Without a more thorough monitoring network, it is impossible to know whether these so-called hot spots are a serious problem. The consequence is hesitation in further use of this potentially effective policy instrument.

A third reason we should want better environmental statistics is that many expensive environmental regulations, with serious consequences for businesses and local economies, are triggered by incomplete information. A prominent example is compliance with air quality standards. Counties and regions that fail to meet these standards risk loss of federal highway dollars, bans on industrial expansion, and mandatory installation of expensive pollution-abatement equipment. Compliance is often based on readings from a small number of monitors. A fair question is whether some communities have been singled out while others have escaped detection. Moreover, although readings from only one monitor may push a portion of a county over a pollution threshold, reestablishing a clean slate once air quality has improved is much more difficult. Recent research by Michael Greenstone of the University of Chicago has shown that many counties remain in official noncompliance even though readings from the available monitors have shown compliance for many years. The Catch-22 is that a county must prove compliance throughout its jurisdiction even if the monitoring network is inadequate to shed light on all areas.

Creating a BES would also facilitate "one-source shopping" for members of Congress, agency administrators, and the public, who currently must navigate a maze of agencies to

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construct a picture of the nation's environment. In addition, an independent BES might lend more credibility—a sense of objectivity—to our environmental statistics, giving the public a commonly accepted set of facts from which to debate policy, much as the Bureau of Labor Statistics and the Bureau of Economic Analysis have done for economic statistics.

### **Lessons Learned from the CPI**

Indeed, our experience with economic statistics teaches us a number of lessons for a BES. First, statistics can be politically controversial. Although widely accepted now, some economic statistics were the focus of past controversy. During World War II, for example, industrial wages were linked to changes in the U.S. Consumer Price Index (CPI). At the same time, the CPI began to move out of synch with the popular perception of price changes, recording much lower inflation rates than people experienced in their everyday lives, largely because it missed quality deterioration in the goods selling at modestly increasing prices: eggs were smaller, housing rental payments no longer included maintenance, tires wore out sooner, and so forth. The result was political uproar, with protests on the home front from organized labor. In the end, a lengthy review process, with representatives from labor, industry, government, and academic economists, resolved the issue.

Although environmental statistics will probably never hit people's pocketbooks as directly as did the CPI, they can get caught in the crossfire between business and environmental groups. Building in a regular external review process would help keep the peace during such moments. Crises aside, external reviews would ensure that a BES is balanced and objective, in both fact and perception, and help improve its quality over time.

Indeed, the regular external reviews of the CPI have raised points that would be of value to a future BES. Some are academic questions about sampling and analyzing data and could be addressed within the agency. Others may require congressional action from the beginning, such as the need for data sharing. In our economic statistics, there is substantial overlap between information collected for the U.S. Census (housed within the Department of Commerce), unemployment statistics and the CPI (collected by the Bureau of Labor Statistics), and the GDP (collected by the Bureau of Economic Analysis). To address this concern, Congress recently passed the Confidential Information Protection and Statistical Efficiency Act, which allows the three agencies to share data and even coordinate their data collection.

Similar data-sharing issues would arise for environmental statistics. Currently, environmental statistics are collected not

*In June, RFF President Paul R. Portney testified about the need for a Bureau of Environmental Statistics before the House Committee on Government Reform, Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs. Excerpts from his statement follow.*

**T**urning to the proposed Bureau of Environmental Statistics (BES), I could hardly be more enthusiastic, though this will not be surprising. While there have been many calls over the years for better environmental data collection and dissemination to elected officials and the public, I believe I was the first to call (in an article I wrote for *Resources* in 1988) for the creation of a BES. I felt then, as I do now, that the creation of such a bureau would have a number of favorable effects.

I believe the bureau should have the same quasi-independent status as the Bureau of Labor Statistics enjoys within the Department of Labor or the Bureau of Economic Analysis has within the Commerce Department. That is, ideally the director of the BES should be appointed by the president for a fixed term (H.R. 2138 envisions a four-year term, though I might prefer a slightly longer one), one that the director should be able to complete even if the president who appoints him or her is no longer in office. Moreover, ideally the director should be someone with a reputation for independence and experience in matters related to environmental data collection and dissemination. It is essential that the director not be seen as someone who might slant the presentation of environmental data for political purposes.

I'd like to raise a word of caution with respect to the language in Section

8(c)(1)(A) and subsequent sections of the bill dealing with the information the BES will collect. There the director is charged with "collecting, compiling, analyzing and publishing a comprehensive set of environmental quality and related public health, economic, and statistical data..."

I understand full well the reasons for suggesting that the bureau go beyond the collection and dissemination of data on environmental quality. After all, we care about environmental quality at least in part because it bears on public health, and also because pursuing it sometimes entails unpleasant economic tradeoffs. Nevertheless, ... [b]ecause it will be a great challenge for the bureau to reach agreement on environmental quality measures alone, I would prefer to see its attention focused there. If it must also wrestle with more traditional public health measures, or measures of economic performance, I fear that the bureau's attention could be spread too thinly and also that its mandate will begin to infringe upon that of the [Bureau of Economic Analysis] or the National Center for Health Statistics. For that reason, I would urge you to think carefully about the types of information that you would ask the bureau to collect, compile, analyze, and publish. We would not want to let the "best be the enemy of the good" in this case. ■

*"Needed: A Bureau of Environmental Statistics," Resources, Winter 1988.*

## **Portney Endorses Bureau of Environmental Statistics, Cautions Congress about Scope**

**Coordination across these agencies—  
and in some cases consolidating tasks  
into the new agency—would be  
essential for producing the best product  
without duplication of effort.**

only by EPA but also by the Departments of Agriculture, Interior, Energy, and Defense. Even some of the economic statistics collected by the Census Bureau and other agencies would overlap in a complete picture of environmental statistics. Coordination across these agencies—and in some cases consolidating tasks into the new agency—would be essential for producing the best product without duplication of effort.

An additional insight gained from looking back on our experience is that economic statistics now play a much larger role in our economy and in economic planning than originally envisioned. Most generally, they have been used as a scorecard for the nation's well-being, a basis for leaders to set broad policy priorities (stop inflation, spur growth), and a basis for the public to assess its leaders. At a more detailed level, they now fit routinely into the Federal Reserve's fine-tuning of the economy. Finally, through indexing of wages and pensions, tax brackets, and so on, the CPI automatically adjusts many of the levers in the economic machine.

One could imagine environmental statistics playing each of these roles. First, despite their current weaknesses, environmental statistics already help us keep score of our domestic welfare. Second, they increasingly could be used to adjust policies. Initially, environmental statistics may serve as early warning signals for problems approaching on the horizon (or all-clear signals for problems overcome). Later, as the data develop and policies evolve to take advantage of them,

they may even be used in fine-tuning. For example, on theoretical drawing boards, economists have already designed mechanisms that, based on regularly collected data, would dynamically adjust caps for pollution levels or annual fish catches. The only thing missing is the data with which to make such mechanisms possible.

A final lesson learned is that high-quality statistics cannot be collected on the cheap. We currently spend a combined \$722 million annually on data collection for the U.S. Census (excluding special expenditures for the decennial census), the Bureau of Labor Statistics, and the Bureau of Economic Analysis, and more than \$4 billion each year for statistical collection and analysis throughout the federal agencies. Over the past three years, these budgets have increased at annual rates of approximately 6.5% and 9.7%, respectively. Nevertheless, these efforts are widely considered to be well worth the cost.

By comparison, the current budget of \$168 million for environmental statistics seems small. Consider that in 1987—the last year for which comprehensive data are available!—the annual private cost of pollution control was estimated to be \$135 billion, and that government spends \$500 million a year for environmental enforcement. With approximately 2% of our GDP at stake in these expenditures, and the welfare of many people, a top-notch set of environmental statistics seems long overdue. ■

*Spencer Banzhaf is an RFF fellow. His research centers on nonmarket valuation of air quality and other public goods. His recent work proposes an approach to incorporating public goods into cost-of-living indexes, such as the U.S. Consumer Price Index.*

#### **FOR MORE INFORMATION**

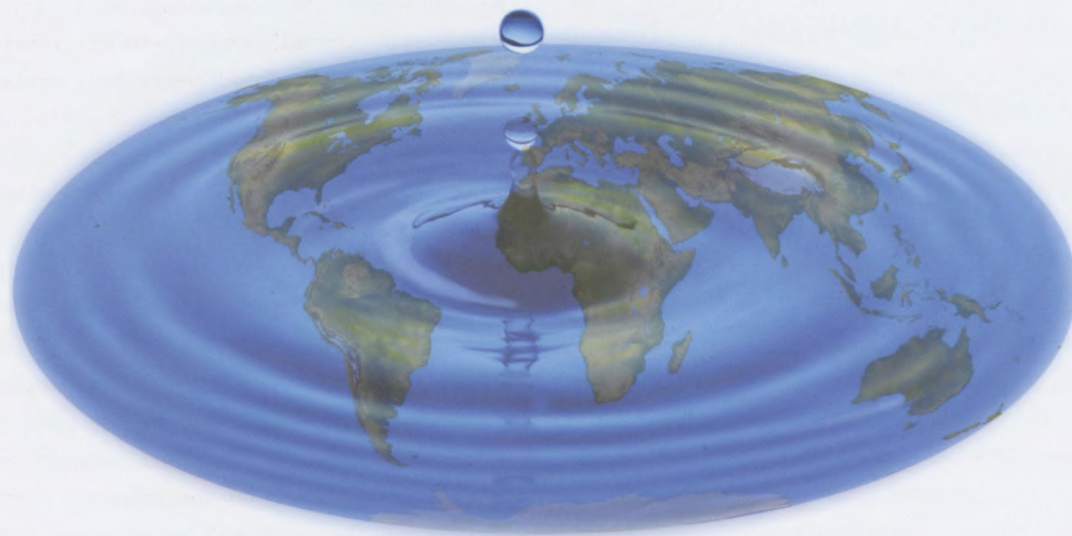
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# Marketing Water,



# Marketing Reform

## LESSONS FROM THE CHILEAN EXPERIENCE

*Carl Bauer*

**T**he world's water resources are seriously strained in many places. While the nature and severity of the problem varies from country to country, the factors driving it are widely shared. Population and economic growth are spurring the global demand for water, used for a variety of purposes, including drinking and domestic needs, agricultural irrigation, mining and manufacturing, electricity generation, public health, environmental protection, navigation, and recreation.

Worldwide, water resources are becoming increasingly scarce in relation to these growing demands. This has had major consequences for public policy at both national and international levels. Shortages have led to increases in water's economic value, growing competition and conflict among different water users, and increasing environmental impacts

of water use. Because these trends are interrelated and reinforce each other, they have led to a vicious cycle of worsening water problems in many parts of the world. It is important to keep in mind that water scarcity is often a problem of water *quality* as well as *quantity*.

For example, during the past couple of years there has been serious tension between Mexico and the United States over the lack of water in the Río Grande, with American farmers claiming that Mexico has failed to deliver the amount of water promised in international treaties and the Mexican government replying that drought has made such deliveries impossible. In a purely domestic context, the San Francisco Bay–Sacramento Delta area of California has been a famous example of a high-stakes collision over water use between agricultural, urban, and environmental interests. Both

state and federal governments and many other stakeholders have been wrangling for years over how to sort the competing claims. A third recent example is Spain, where water scarcity in the country's southern regions has led the Spanish government to propose a controversial national plan to build new dams and reservoirs and to transfer water from northern rivers to the south.

In all of these examples of water scarcity and conflict, market mechanisms and incentives have been part of the debate about how to address the problems. The application of markets, however, has been limited by different political, economic, and social concerns. In Chile, by contrast, water law and policy are dominated by the free market—more than any other country in the world. For policymakers, there are important lessons to be learned from the Chilean experience.

International recognition of the world's water challenges has led to urgent calls for reforming water resources policy and management, and to substantial debate about what those reforms should accomplish. These debates have taken place at high-profile international conferences, such as the Earth Summit in Río de Janeiro in 1992 and the Second World Water Forum at The Hague in 2000, and within international development organizations, such as the World Bank, the United Nations, and many others. Much of this discussion has been part of broader international debates about how to achieve "sustainable development." Most of the major issues



### The Dublin Principles of Integrated Water Resources Management

*Probably the best-known expression of IWRM is the "Dublin Principles," named for an international water conference held in Dublin, Ireland, in 1992, as part of the preparation for the Earth Summit in Río.*

- ③ Fresh water is a finite and vulnerable resource, essential to sustain life, development, and environment.
- ③ Water development and management should be based on a participatory approach, involving users, planners, and policymakers at all levels.
- ③ Women play a central part in the provision, management, and safeguarding of water.
- ③ Water has an economic value in all its competing uses and should be recognized as an economic good.

*(From Final Conference Statement, International Conference on Water and Environment, Dublin, Ireland, 1992)*

are also central to contemporary water policy debates in the United States, although the domestic discussion has generally not been set in an international context.

### International Debate about Water Policy

There is growing consensus that water policy reforms should move toward what is called "integrated water resources management" (IWRM). IWRM refers to a set of general principles rather than specific policy guidelines (see box at left for more detail).

The basic idea of IWRM is to adopt a comprehensive, interdisciplinary, and holistic approach to dealing with water resource issues, including their social, political, economic, and environmental aspects. Such an approach would replace the fragmented and sector-specific approaches that historically have dominated most countries' water laws, policies, and institutions. In contrast, IWRM focuses on the overall water cycle and on river basins and watersheds as the most appropriate geographic units for water management. It therefore places more emphasis on the relationships between water uses and land uses, between groundwater and surface water, between water quality and water quantity—and between natural sciences and social sciences.

The most controversial of the Dublin Principles has been the last one—that water "should be recognized as an economic good." What does this phrase mean, and, more importantly, what are the policy implications? How does this "economic" principle relate to the broader goals and functions of integrated water resources management? There has been heated international debate about these questions, and three major positions have been staked out.

On one extreme is the free-market argument: that water should be managed as a fully tradable commodity, subject to the forces of supply and demand in an unregulated market, and that water's economic value is the same as its free-market price. This is the Chilean model. On the other extreme is the anti-market argument: that water should be exempt from market forces, because water is a resource so essential to human existence that it belongs in the category of basic human rights and should be managed according to criteria of social equity and justice rather than economic efficiency.

An intermediate position is the argument that water should be recognized as a scarce resource, which means that we face difficult choices and trade-offs in how we allocate water to different uses. These trade-offs will be less painful if we can increase the efficiency of water use and allocation, for which market incentives can be powerful instruments as long as they are adequately regulated. From this perspective, the key word is "instruments" rather than controlling philosophy.

This is the context in which Chile's recent experience has global significance. In 1981, the Chilean government enacted an extremely *laissez-faire* water law, which privatized water rights, promoted free market forces and incentives in water use, and sharply reduced governmental regulatory powers in water management. During the two decades since then, the Chilean Water Code has been the world's leading example of a free-market approach to water law and policy—a unique experiment in treating water rights not merely as private property but also as a fully marketable commodity. Other countries, including the United States, have long recognized variations of private property rights to water, but none have done so in as unconditional and deregulated a manner as Chile. The 1981 Water Code is still in force today, protected by Chile's 1980 Constitution.

Because the Chilean Water Code is such a paradigm for free-market reforms, it has often been mentioned in international debates about water policy. The predominant view outside of the country is that the Chilean model of water management has been a success. The strongest proponents of this view have been economists at the World Bank, the Inter-American Development Bank, and related institutions, who have encouraged other countries to follow Chile's lead. Other water experts, particularly those associated with United Nations agencies, have been more critical. Too often, however, the arguments have been based on theoretical and political beliefs rather than on empirical study.

### A Closer Look at the Chilean Experience

More than 20 years have passed since Chile's pioneering water law was enacted and the country's experience since then has much to offer in terms of lessons learned. This assessment is based on extensive fieldwork in Chile as well as analysis of current international water policy debates, part of a long-term RFF research project. For both political and economic reasons, this research has focused on the Water Code's second decade, after Chile returned to democratic government in 1990.

If we look back from 2003, two key points stand out. In the first place, *within* Chile the entire period since 1990 has been characterized by strong political disagreement about water rights and water markets. This national debate has been driven by the continuous efforts of the Chilean government to modify the Water Code's most *laissez-faire* aspects. The same centrist political coalition that has governed Chile since 1990 has proposed a series of legislative reforms to strengthen regulatory capacity in water issues, in order to address growing public concerns about river basin management, environmental protection, and private monopoly and speculation in

*International recognition of world water problems has led to urgent calls for reforming water resources policy and management, and to substantial debate about what those reforms should accomplish.*

water rights. Much of the policy debate has been about the legal rules defining property rights to water, and about how the current rules have affected the economic incentives for water use and water rights trading.

Conservative political parties and business interest groups, however, have blocked all of the government's proposals. Under the current constitutional framework, these opponents effectively have veto power over economic and regulatory issues. The government has responded over the years by gradually weakening its proposed reforms in an effort to achieve consensus, but without success.

Somewhat surprisingly, the long-standing and highly ideological nature of this conflict has been virtually unknown outside Chile, and has been absent from most international discussions of the Chilean water-policy model. These international discussions, in other words, have been uninformed by critical aspects of the model's political and institutional context.

The second key point is that in spite of the controversy, there has been relatively little empirical research about the Chilean model's results in practice. The research that has been done has focused almost exclusively on water markets and water-rights trading, which are the aspects of the Water Code that have attracted the most attention. As a result of this focus, our empirical understanding of how Chilean water markets work has gradually improved over the course of the 1990s, evolving from exaggerated claims of dramatic success to more balanced descriptions of mixed results. It is also important to note that Chilean water markets have been largely confined to the agricultural sector.

By the end of the decade, informed observers agreed that in most parts of the country water markets have been inactive and have had a limited impact on the efficiency of water use and the reallocation of resources. These results are due to a variety of constraints and transaction costs. Clearly, the

*While economic principles can be powerful tools for dealing with water scarcity, legal and political institutions are the key to resolving water conflicts, and the world's water problems are driven by the ever-closer relationship between scarcity and conflict.*

greatest economic impact of the Water Code has been the boost to private investment due to the increased legal security of property rights rather than the relative inactivity of the overall market for water.

This consensus refers to the empirical description of Chilean water markets, not about the policy implications that should follow. In Chile, the debate continues about whether legal reforms should seek to make water markets work more smoothly and in more circumstances or, instead, limit their scope.

But it is essential to not lose sight of the water management issues that have received much less research attention. The two most important issues are the impacts of the Water Code on social equity, especially on peasant farmers and the rural poor, and the performance of the institutional framework in coordinating multiple water uses, managing river basins, resolving water conflicts, and protecting river ecosystems and instream flows. The available studies and evidence indicate strongly that both issues demonstrate serious weaknesses of the Chilean model. This conclusion should set off alarm bells for people concerned with the policy implications for other countries, because these issues are at the heart of integrated water resources management.

### Lessons Learned

Chile's 20 years of experience with its free-market water law suggest several lessons for current international discussions of water policy reforms. Perhaps the most obvious is the reminder that the effectiveness of market-based eco-

conomic instruments depends on their noneconomic contexts, including legal and institutional arrangements, political decisions, and the physical realities of geography and natural resources. This is not a new idea, but it has often been overlooked in the recent enthusiasm for the simple recipe of unregulated markets.

A second lesson is that the strengths and weaknesses of the Chilean model are closely interconnected, because both reflect the same legal and institutional framework. The Chilean approach to "recognizing water as an economic good" has led to some important economic benefits, such as encouraging private investment and allowing more flexibility of resource allocation. However, the legal and institutional consequences of this approach have hamstrung government efforts to respond to the growing social and environmental problems of water management, which the 1981 Water Code was not designed to address. This rigidity of the Chilean model, and hence its incompatibility with core aspects of IWRM, have been downplayed by the model's international proponents, who continue to argue that any flaws are secondary or can be readily corrected.

Finally, the Chilean experience confirms the need for a more interdisciplinary perspective on water law and economics in designing policy reforms. While economic principles can be powerful tools for dealing with water scarcity, legal and political institutions are the key to resolving water conflicts, and the world's water problems are driven by the ever-closer relationship between scarcity and conflict. ■

*Carl Bauer is an RFF fellow. He recently spent more than a year doing research in Chile, where he wrote a book from which this article is excerpted. Much of his work there was funded by the William and Flora Hewlett Foundation. The book will be published by RFF Press in early 2004.*

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# Market-Based Approaches to Environmental Policy

A "REFRESHER" COURSE

*Paul R. Portney*

Upon hearing the term "market-based approaches to (or economic incentives for) environmental protection," some people assume this means letting unfettered competition between unregulated private firms determine how clean our air or water will be, how much open space we will have, or how many fish stocks will be driven to collapse.

Nothing of the sort is intended. In fact, market-based approaches to environmental protection are a clever form of government regulation. They are premised on the recognition that while competitive markets are a wonderfully efficient means of deciding what types and quantities of consumer goods should be produced, they generally fail with respect to environmental quality, the provision of "public goods" like open space and common-property resources like fisheries. Every undergraduate and graduate economics textbook discusses this notion of "market failure," and the environment is always the first illustration that is used.

Given the very necessary government role in protecting the environment, the real question becomes how best to do this. Market-based approaches to environmental protection are premised on the idea that it is possible to confront private firms, individuals, and even other levels of government with the same kinds of incentives they face in markets for labor, capital, and raw materials—that is, prices that force them to economize. The rationale for market-based approaches, in other words, is to try to put the powerful advantages of markets to work in service to the environment.

## *Command-and-Control Era*

To paint a quick picture of traditional regulation, consider the case of air and water pollution control. Prior to the early 1970s, the regulation of air and water pollution was almost exclusively the responsibility of state and local governments. In fact, the Clean Air Act amendments of 1970 and the Federal Water Pollution Control Act Amendments of 1972 marked the first really substantial federal involvement in environmental protection.

Under the Clean Air Act, the federal government (in the form of the then-new U.S. Environmental Protection Agency, or EPA) began specifying the pollution-control equipment that any new plant had to embody. In addition, EPA required local areas to formulate plans to reduce pollution from existing sources so that the air quality standards that EPA began issuing would be met. These plans typically required large, privately owned industrial facilities to reduce their pollution the most, and often required other sources to roll back their pollution by uniform amounts. Both new and old facil-



ities had to apply for and receive operating permits from EPA that specified allowable emissions. In addition, the federal government also began limiting for the first time the tailpipe emissions of new cars rolling off the assembly lines of both domestic and foreign manufacturers. While the emerging water pollution regulations differed somewhat, at their heart, too, were a series of technological requirements for both newly constructed and existing plants, coupled with mandatory permits that specified allowable emissions.

Despite protests to the contrary, both programs have had significant successes, most notably in the case of the Clean Air Act. Since 1970, air quality around the United States has improved dramatically in almost every metropolitan area and for almost every air pollutant. For one notable example, airborne concentrations of lead, an especially insidious threat to health, were 93% lower in 2000 than they were in 1980. Success under the Clean Water Act has been less dramatic, though quite obvious in many places. Rivers that 30 years ago had almost ceased to support aquatic life have seen fish strongly rebound (even if it is still inadvisable to eat the fish one catches in some places).

Despite these successes, by the late 1980s dissatisfaction with the technology-based standards approach had become rampant. First, by requiring sources of air and water pollution control to meet emissions standards keyed to a particular type of technology, many regulations had effectively

“frozen” pollution control technology in place. No one had an incentive to invent a more effective and/or less expensive pollution control technology as long as some other technology had received EPA’s blessing. Second, by requiring regulated firms to have specific types of pollution control in place, they were denied the flexibility to modify their production process or reformulate their product(s) in such a way as to reduce their emissions because they would still be required to use whatever technology was applicable. Finally, it was becoming clear that the technology-based command-and-control system was overly expensive. Study after study showed that it would be possible to meet the same environmental goals—either in terms of ambient air quality or in terms of emissions from affected sources—for much less money than the current approach was costing.

### *Cap and Trade vs. Pollution Taxes*

There are two principal market-based approaches to environmental protection, both of which owe much of their popularity today to a small group of economists, most notably the late Allen Kneese of RFF. While mirror images of one another in many important respects, one market-based approach looks not unlike the current regulatory system while the other appears to be a more radical departure. The more familiar-looking approach to air or water pollution control

would still be based on a system of required emissions permits. Under this approach—generally referred to as a “cap-and-trade” system—each pollution source is given an initial emissions limitation. It can elect to meet this limit any way it sees fit: rather than being required to install specific types of control technology, the source can reduce its pollution through energy conservation, product or process reformulation (including substitution of cleaner fuels), end-of-pipe pollution control, or any other means. Importantly, and not surprisingly, each source will elect to reduce its pollution using the least expensive approach available to it.

More surprisingly, a source has one additional option under the cap-and-trade system: it can elect to discharge *more* than it is required so long as it buys at least equivalent emissions reductions from one or more of the other sources of that pollutant. All that matters is that the total amount of emissions reductions that take place from all sources are equal to the initial cap established by EPA (or another regulatory authority). Those sources that will elect to make significant emissions reductions under this system are precisely those that can do so inexpensively; likewise, those that elect to buy emissions reductions from other sources rather than cut back themselves will be those that find it very expensive to reduce. (This is the analogue to Adam Smith’s famous “invisible hand” that steers producers and consumers to the most efficient allocation of resources.) Moreover, all sources have a continuing incentive to reduce their pollution—the more a source’s emissions fall short of its limitation, the more emissions permits it will have to sell to other sources.

The flip side of this approach is one in which *no* limits are placed on each ton of pollution that a source emits, but in which each ton is taxed. Pollution taxes are paid to the government, which is then free to use the revenues as it sees fit—to reduce other taxes, spend on pollution control R&D, reduce the national debt, etc. While appearing very different from the cap-and-trade approach, this system creates the very same set of incentives. That is, the firms that can reduce their pollution inexpensively will invest in doing so because each unit of pollution reduced is that much less paid in pollution taxes. Firms that find it very expensive to reduce their pollution will continue to discharge and pay the taxes; note, however, the strong and continuing incentive the latter have to find ways to cut their emissions—and the higher the taxes on

pollution, the stronger that incentive. Also, both a cap-and-trade system and a pollution tax create the same incentive to reduce pollution that the wage rate creates for firms to minimize the amount of labor they use or that the interest rate has in disciplining firms’ borrowing.

The cap-and-trade approach began to be implemented in a small-scale way in the late 1970s and early 1980s in both Democratic and Republican administrations. But the first really large-scale application of cap-and-trade—which resulted in the most significant environmental policy success since 1970—came in the 1990 amendments to the Clean Air Act. In order to reduce emissions of sulfur dioxide by 50% in the

eastern half of the United States, an ambitious cap-and-trade system was created under which more than 100 large coal-fired power plants were given initial emissions reductions. These plants could meet their emissions reductions targets themselves, through any means they selected, including shifting from high- to low-sulfur coal. However, the affected plants were also given the ability to purchase excess emissions reductions generated by other plants that found it easy to reduce their sulfur dioxide.

This approach has resulted in reductions in sulfur dioxide emissions that have been both larger and faster than required by the law. Moreover, the annual savings to electricity ratepayers nationally (compared to the previous command-and-control approach) range from 50–80% and these savings amount to \$1–6 billion annually, depending on whose estimates one wants to use. As a result of this success, cap-and-trade approaches are now being proposed for additional reductions of sulfur dioxide, nitrogen oxides, and mercury under the Bush administration’s Clear Skies Initiative. They have also been put forward by former EPA Administrator Christie Todd Whitman for reducing water pollution in certain watersheds, by state and local governments seeking smog reductions, and by foreign governments exploring lower-cost approaches to a variety of environmental problems. The European Union has just announced that it will use a cap-and-trade system to control carbon dioxide as it struggles to comply with the terms of the Kyoto Protocol, which is still alive in Europe.

### *Uncertainties Created by Each System*

Large-scale experiments with pollution taxes are harder to find in the United States. Under the 1987 Montreal Protocol

*The rationale for market-based approaches is to try to put the powerful advantages of markets to work in service to the environment.*

to phase out worldwide use of chlorofluorocarbons (CFCs) and other ozone-depleting substances, a tax was levied on CFC production during the time mandatory phase-out was taking place, although this is clearly a hybrid system under which command-and-control regulation was augmented by a pollution tax. The evidence to date suggests that this hybrid approach is working well—CFC emissions have fallen and early evidence is that the stratospheric ozone “hole” has stopped growing.

Interestingly, perhaps the most ambitious application of pollution taxes is occurring not at the federal or even state level of government, but at the local level. Hundreds of communities around the United States have adopted “pay-as-you-throw” systems for household garbage collection. Rather than charge every household the same amount for refuse collection, these communities are charging households a fixed amount per bag of garbage collected at curbside. This has had the effect of reducing the amount of yard wastes that end up in municipal landfills (households are composting more) and possibly even changing households’ purchasing decisions toward products which come with less packaging.

Why have cap-and-trade policies flourished in comparison to pollution taxes in the United States? Perhaps most obviously, a system in which discharge permits are issued, but made saleable, looks rather like the regulatory system currently in place in the United States, with the added twist of marketability. Another reason has to do with the uncertainty each system creates. Specifically, under a cap-and-trade system, the total amount of pollution is firmly fixed—that is the purpose of the cap. What is uncertain are exactly where the emissions will occur (this depends upon who trades with whom), and how much an emissions permit (the right to emit one ton in a given year, say) will cost—the latter is determined in a competitive market.

Under a pollution tax, sources are allowed to discharge as much as they want, as long as they pay the per unit charge for each ton emitted. Thus, there is uncertainty about the total amount of pollution discharged (though we can be sure that the higher the tax, the lower the amount of pollution discharged). There is no uncertainty under the latter system about the maximum amount it will cost to reduce a ton of pollution, though, because that will not exceed the per-ton tax. The total amount of revenue raised by such a system is not

predictable, because if sources can reduce their emissions less expensively than is believed to be the case, they will discharge less to avoid the tax. In years past, environmentalists objected to pollution taxes on the grounds that sources faced no pollution limits at all and could continue to pollute as long as they paid the corresponding taxes. Note, however, that this approach makes sources pay for every single unit of pollution that they discharge—unlike the command-and-control system in which firms are given considerable amounts of “free” emissions in the form of any discharges they may make so long as they are beneath their permitted levels.

The choice between cap-and-trade systems and pollution taxes rests in part on the pollutant in question. For pollutants like sulfur dioxide, CFCs, or carbon dioxide that mix equally in the atmosphere and that pose few or no local health effects, cap-and-trade works well because we are unconcerned about where emissions take place. On the other hand, if we are concerned that limiting emissions might impose too big a burden on the economy, the pollution tax approach is best because sources know that they will never have to pay more for a ton of pollution discharged than the tax. Effluent charges also raise revenue—not a trivial issue in many places, including developing countries.

One thing is for sure. Market-based approaches to environmental protection have become the default option in much of modern environmental policy, both in the United States and abroad. But it would be a mistake to claim that command-and-control regulation is dead. First, there are some cases where market-like solutions won’t do the job. If an imminent, serious hazard to human health and the environment is discovered, an outright ban is likely to be the appropriate policy response. Second, some still prefer that companies be punished for their emissions by making them pay as much as possible to alleviate them. But this is premised on the misguided notion that firms pollute because they are malevolent, rather than because pollution is one consequence of making things that society demands. Moreover, such an approach really only punishes the customers, employees and shareholders of the firm, for they are the ones who will end up bearing the costs. ■

*Paul R. Portney is president of RFF and a senior fellow. A longer version of this article was written for a recent Aspen Institute conference, “The Convergence of U.S. National Security and the Global Environment.”*

*Both a cap-and-trade system and a pollution tax create the same incentive to reduce pollution that the wage rate creates for firms to minimize the amount of labor they use.*

### Harvard Economist Robert Stavins Joins RFF Board



ROBERT N. STAVINS

Robert N. Stavins, a Harvard economist whose pioneering work in environmental economics has helped bring market-based tools to public policy, has joined RFF's Board of Directors. At Harvard, he is the Albert Pratt Professor of Business and Government, chairman of the Environment and Natural Resources Faculty Group at the John F. Kennedy School of Government, and director of the Environmental Economics Program.

Stavins entered environmental economics because of a personal interest in the environment. As a Peace Corps volunteer in Sierra Leone, he first encountered the trade-offs between economic development and a pristine natural environment. While studying agricultural economics at Cornell, he saw an opportunity to examine social questions with quantitative methods, and at Berkeley, he learned the power of using simple models to yield insights into policy problems, such as water allocation in California. At the Environmental Defense Fund (now Environmental Defense), he observed the use of economic analysis in pursuit of better environmental policy. That led him to graduate study in economics at Harvard, whose faculty he joined after earning his Ph.D.

"What attracted me to the Kennedy School," Stavins says, "was the possibility of combining an academic career with intensive and

extensive involvement in the formulation and execution of public policy." The interplay between scholarly research and real-world implementation is evident in Stavins's many peer-reviewed publications but is perhaps most apparent in his work as director of "Project 88," a bipartisan effort co-chaired by former Senator Timothy Wirth and the late Senator John Heinz, which identified and described market-based instruments for environmental protection.

According to Stavins, "It is typically assumed—at least within academic circles—that the relationship between research and outreach work in the policy community is a one-way street, where academics spread the gospel to practitioners in the field, drawing upon the results of their own and others' scholarly research." But in many cases—Project 88 being a prime example—"my participation in policy matters has stimulated for me entirely new lines of research."

Project 88 eventually informed the development of the first Bush administration's environmental policies and led to the tradable permit system for acid rain reduction, included in the 1990 Clean Air Act amendments.

In other work, Stavins has investigated the causes of wetlands conversion to cropland, including the unintended role played by federal flood control and drainage projects. And he has extended the methodol-

ogy for analyzing land-use changes to investigate the costs of mitigating climate change through carbon sequestration by increasing forestation and slowing deforestation. Current research includes analyses of technology innovation and diffusion, environmental benefit valuation, and the political economy of policy instrument choice.

Stavins is an RFF University Fellow and has coauthored papers with RFF researchers and Paul Portney, RFF president. He is a member of the Environmental Economics Advisory Committee of the U.S. Environmental Protection Agency's Science Advisory Board, the board of directors of the Robert and Renée Belfer Center for Science and International Affairs, the board of academic advisers of the AEI-Brookings Joint Center for Regulatory Studies, and the editorial boards of the *Journal of Environmental Economics and Management*, *Resource and Energy Economics*, *Land Economics*, *Environmental Economics Abstracts*, *B.E. Journals of Economic Analysis & Policy*, and *Economic Issues*. He is also a contributing editor of *Environment*.

Stavins believes in the value of economic analysis for environmental policy. Because the cause of virtually all environmental problems in a market economy is economic behavior (the operation of imperfect markets tainted by externalities) he says, economics offers "an exceptionally valuable perspective" for viewing environmental problems and "a powerful set of analytical tools for designing and evaluating environmental policy."

RFF's newest board member's dedication to statistical analysis falters during baseball season, however: notwithstanding empirical evidence to the contrary, Stavins is an ever-optimistic Red Sox fan. ■

## Helping to Build RFF's Legacy



VICTORIA J. TSCHINKEL

Dear Friends,

After nine years of service on the RFF Board of Directors, I retired in October 2002. I have been so pleased to be affiliated with RFF over these many years. Like you, I find RFF to be a trusted “voice of reason” in the environmental and natural resource policy debate. RFF scholars do not undertake their research with any preconceived outcomes in mind; they simply follow the facts wherever they might lead. Time and again, RFF has proven to be an invaluable resource for policymakers, environmental advocates, corporate executives, members of the media and academic communities, as well as for the general public. I can personally attest to this, having been a member of most of these constituencies at various times in my career!

For these many reasons, I have also been a longtime financial supporter of RFF. RFF relies on the support of its donors to fund its independent research. And as RFF grows and expands its agenda, its financial integrity becomes even more important.

As much as I would like to be, I will never be a fantastically wealthy individual. I am able to support RFF with modest annual gifts, but I always felt like I wanted to do more. Fortunately, I discovered that there is a very easy way to support RFF on a more significant level—through planned giving.

RFF's planned giving program offers a variety of giving options, including charitable gift annuities, charitable remainder trusts, and bequests. You can also name RFF as a beneficiary of your bank account, retirement plan, or insurance policy. Each option offers unique advantages, allowing you to tailor your giving to meet your personal financial needs and goals. By making a planned gift, it is possible to make a significant donation to RFF, ensuring RFF's long-term vitality and financial strength, and take advantage of favorable tax laws now.

To recognize donors of planned gifts, RFF has launched the Legacy Society, of which I am the proud chair. Individuals making a planned gift prior to September 30, 2003, the close of RFF's 50th anniversary \$30 million campaign, will be acknowledged in perpetuity as a founding member. All members of the Legacy Society are acknowledged in RFF's Annual Report. Donors who make planned gifts of \$100,000 or more are honored with lifetime memberships on the RFF Council, a recognition group for RFF's most generous supporters for which we offer many special benefits.

I hope you will consider joining me as a member of the Legacy Society. If you would like more information on supporting RFF through planned giving, please contact Lesli Creedon, director of development, at 202-328-5016 or [creedon@rff.org](mailto:creedon@rff.org). ■

Best regards,  
Victoria J. Tschinkel

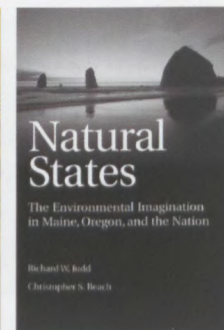
## A Report from RFF Press

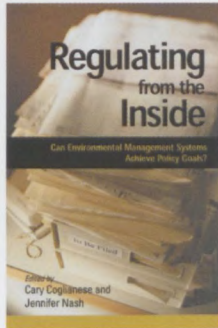
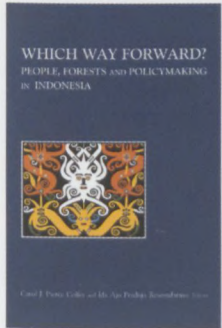
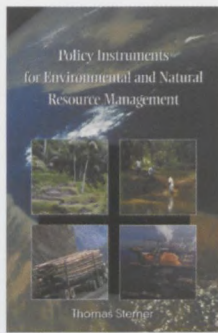
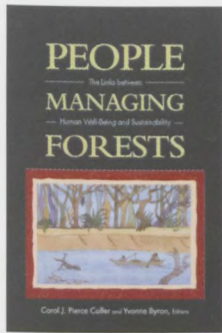
RFF Press supports the mission of RFF by publishing books that make a distinct, original contribution to scholarship, teaching, debate, and decisionmaking about important issues in environmental and natural resource policy.

### New Publications

*The Promise and Performance of Environmental Conflict Resolution*, Rosemary O'Leary and Lisa Bingham, editors. Leading academics and practitioners evaluate mediation as a tool for resolving environmental disputes, providing critical evidence about the kinds of disputes for which it has and has not been successful.

*Natural States: The Environmental Imagination in Maine, Oregon, and the Nation*, Richard Judd and Chris Beach. While it will directly appeal to people with a connection to Oregon or Maine, this book is also important for its exploration of how broader trends in environmental policy emerged from the interaction of local, state, and national politics—and for its contribution to our knowledge about how popular ideals and populist politics have influenced environmental policy.





## Reviews

*People Managing Forests: The Links between Human Well-Being and Sustainability*, Carol J. Pierce Colfer and Yvonne Byron, editors

*UNASYLVA: An International Journal of Forestry and Forest Industries* (published by the UN Food and Agriculture Organization): "It pursues the fundamental question: How can conditions be created that allow people who live in and around forests to maintain the valued aspects of their own way of life and to prosper while still protecting those forests on which they, and perhaps the rest of humankind, depend? ... Anyone with an interest in the cultural and social dimensions of sustainable forest management would find the book valuable."

*Which Way Forward? People, Forests, and Policymaking in Indonesia*, Carol J. Pierce Colfer and Ida Adju Pradnja Resosudarmo, editors

*International Forestry Review*: "A very powerful combination ... from a diverse set of authors, each writing from

different perspectives and displaying a deep understanding of the issues."

*Policy Instruments for Environmental and Natural Resource Management*, Thomas Sterner

*Regulation*: "[Deals] systematically and broadly with theory and practice ... [Sterner] has fully surveyed the economics of environmental and pollution control and given a broad sample of applications ... a viewpoint that is absent in the literature ... a valuable guide to the problems of implementing environmental policy."

## Outreach

In an effort to broaden stakeholder awareness of new tools for improving environmental performance, the Press recently hosted a workshop on private-sector management

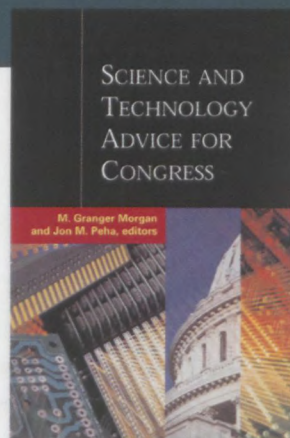
approaches. Cary Coglianese and Jennifer Nash, of Harvard's Kennedy School of Government, organized the workshop, which was sponsored by the Kennedy School, RFF Press, the U.S. Environmental Protection Agency, and others. The participants, a range of state and local government officials, EPA staff, and scholars, evaluated the current evidence on management-based strategies and discussed the lessons to be learned for future developments. The workshop themes were closely related to Coglianese and Nash's 2001 RFF Press book, *Regulating from the Inside: Can Environmental Management Systems Achieve Policy Goals?* The authors plan to develop a new book, based in part on the workshop discussions. For more information, visit: [www.ksg.harvard.edu/cbg/Conferences/rpp\\_leveraging\\_conference/home.htm](http://www.ksg.harvard.edu/cbg/Conferences/rpp_leveraging_conference/home.htm).



**RFF'S 2003 SUMMER INTERNS** RFF sponsors a summer internship program designed to give students the opportunity to work with members of the research staff on ongoing projects or assist in the development of entirely new areas of research and policy analysis. RFF also offers an internship in honor of Dr. Walter O. Spofford, Jr., who helped establish RFF's China Program, and an internship with RFF Press, our book publishing arm. Pictured here are several of this year's interns.

From left: Aaron Severn, Paul Sorisio, Ryan Derry, David Chen, Nicholas Burger, Marc Tarlock, Kathleen Chiang, Jiang Ru (Spofford), Jessica L. Bailey (RFF Press), Luther Carter, and James Boyd, RFF senior fellow and division director. Not pictured: Jen Graham, Maria Damon, Kirsty Michaud, Katrina Jessoe, Jaakko Heikkilä, Daniel Kaffine, and Joseph Keithley.

# From RFF Press



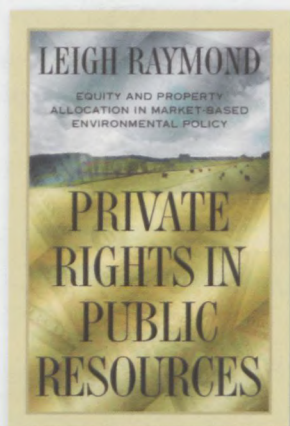
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