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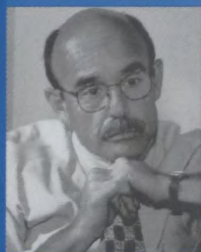
Anecdotal evidence suggests that firms can profit from operating clean and green. To what extent the phenomenon actually occurs requires further study.

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Marion Clawson's Long View of the Land

Known for pragmatism as well as cantankerous charm, Clawson belonged to RFF's first generation of research fellows.



Paul R. Portney

The Allure of the Market Endures

Economists are forever talking up markets—admiring their beauty and relentless efficiency. But markets don't necessarily occur everywhere that they could be useful. Take water, for example. Though it is often scarce relative to want, we will probably never see water sold in markets like those we use to allocate most goods and services. Yet, as RFF Senior Fellow Ken Frederick tells us in this issue of *Resources*, the benefits to be had if we did remain tantalizing. Eventually, Frederick suggests, we will market water much more than we do now, only in less obvious ways.

In the past, electricity has not been sold competitively in the United States, either. Despite changes that have made its generation amenable to competition, most states have yet to decide whether to allow customers to "shop around" among competing sellers of electricity. Curious as to what factors motivate some states to act while others dither, RFF fellows Amy Ando and Karen Palmer report the findings of their clever statistical analysis of this question.

In perhaps what is the most studied market of them all—the stock market—do companies with outstanding environmental records do better than their "dirtier" counterparts? RFF Fellow David Austin's look at the available evidence suggests that, at the least, firms are not penalized for so-called green investments. However, when an environmentally sensitive company prospers, Austin finds, we must be careful to think clearly about which way the causal connection runs.

These articles demonstrate that markets are not always easy to create, quick to adapt, or transparent in their consequences. Indeed, they sometimes can seem downright alien. Speaking of which, when RFF Senior Fellow Molly Macauley, who is profiled here, first began to apply economic principles to the exploration of outer space at RFF, space aficionados considered it heresy to talk dollars and cents. Nowadays Macauley's common sense prompts congressional invitations to testify on space.

This issue also contains an appreciation of our late mentor, friend, and colleague Marion Clawson. For fully seventy years he brought to natural resource policy in the United States a keen understanding of the virtues and limitations of markets—not to mention a penchant for straight talk.

How well do we at RFF connect our market musings with real life? Apparently well enough to earn the support of the RFF Council, some of whose members describe below how they and we match up. It is just as much our goal to connect with you our readers through the research that we report here.

Paul Portney

Paul R. Portney



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Published quarterly since 1959, *Resources* (ISSN 0048-7376) contains news of research and policy analysis regarding natural resources and the environment. The views offered are those of the contributors and should not be attributed to *Resources for the Future*, its directors, or its officers. Articles may be reproduced, providing credit is given and a copy of the reproduced text is sent to *Resources*.

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GOINGS ON

Focusing on stewardship

Two senior Clinton administration officials spoke to the importance of long-term stewardship at the nation's former nuclear weapons production sites when RFF held its second workshop on the subject this spring. Long-term stewardship includes four major functions: site monitoring and maintenance, application and enforcement of institutional and other controls to prevent inappropriate land and groundwater use; information management systems to keep future populations apprised of site hazards; and environmental monitoring of remaining site hazards.

In the workshop's keynote address, acting Energy Secretary Elizabeth Anne Moler reaffirmed her department's commitment to long-term stewardship as the next major challenge once DOE completes its monumental task of cleaning up the vast quantities of hazardous and radioactive materials left behind from decades of Cold War weapons production in thirty states. Effective execution of both the cleanup and stewardship tasks, she said, will mean working with communities "much more closely now than we did in the past" to ensure that local needs and concerns are met. "By listening to communities," Moler told her audience, "I believe we will become more effective stewards of our sites. Communities that contributed so much during the Cold War effort," she con-

tinued, "deserve to have confidence that the federal government will restore their local environment and ensure work and public safety."

Tim Fields, who is EPA's acting assistant administrator for solid waste and emergency response, spoke in similar terms, noting that "long-term stewardship is a vital issue that merits a full and open discussion." There must be an "opportunity for meaningful involvement of those interested in and affected" by any long-term stewardship program. Consultation with the public is especially important, he said, with regard to federal sites, especially DOE facilities, where contaminants will remain in some instances for thousands of years.

Fields outlined some possible next steps to maintain momentum on the development of a successful stewardship program. These include revising an executive order to direct federal agencies to request adequate funding to carry out stewardship-related functions; establishing an inter-agency workshop to consider what role the federal government might best play in the effort; and convening a group of outside experts to study issues associated with developing a stewardship program, consistent with existing laws and regulations.

The workshop also included panel discussions about two former nuclear weapons production sites, the Oak Ridge site in Tennessee and the Rocky

DUPONT PHOTOGRAPHERS



Acting Energy Secretary Elizabeth Anne Moler gave the keynote address at RFF's workshop in April on long-term stewardship of the nation's former nuclear weapons production sites.

Flats site in Colorado. Each panel included a representative of the federal government, state government, and a local citizen's group, as well as someone concerned about economic redevelopment of the site.

The workshop also focused on identifying the many questions that need to be answered before a stewardship program can be implemented. For example, how encompassing should such a program be? Should it cover DOE facilities only, extend to all contaminated sites including private commercial nuclear facilities, or consist of something in between? Which federal agency should be primarily responsible for implementing federal stewardship activities at DOE sites? Is a formal regulatory oversight structure warranted? While there was certainly not consensus on the answers to these

questions, a number of major themes emerged, most importantly that a stewardship program is needed, that it should encompass all contaminated sites addressed under the nation's environmental laws, and that both DOE and EPA need to take action to make a stewardship program a reality.

RFF's Center for Risk Management hosted the workshop, co-chaired by Senior Fellow Katherine N. Probst and CRM Director Terry Davies. DOE's Office of Strategic Planning and Analysis provided financial support through a cooperative agreement with RFF. Fifty people representing federal, state, and local governments, tribal nations, citizens' groups, and academia attended the invitation-only event.



For a comprehensive listing of CRM's work on issues related to the nuclear weapons complex, go to <http://www.rff.org/library/index.htm>. See also the recently published RFF report "Long-term Stewardship and the Nuclear Weapons Complex: The Challenge Ahead" at <http://www.rff.org/reports/summaries/stewardship.htm>. Order hard copies by calling 410-516-6955.

Learning from experiments

Novel transportation projects designed to improve air quality and reduce congestion should be structured like scientific experiments to find out what about them works—and what doesn't—to help design better



projects in the future. Senior fellows Alan Krupnick and Winston Harrington, along with former RFF Research Associate Deirdre Farrell offered this assessment as part of their evaluation of six projects in the Congestion Mitigation/Air Quality (CMAQ) program established under the Intermodal Surface Transportation Efficiency Act in 1991.

The CMAQ program, which receives about \$1 billion a year in public funding to support transportation projects that improve air quality, is controversial. Some critics see the program as a kind of environmental pork that diverts funds away from conventional highway improvement projects. It does not help, therefore, that the value of CMAQ projects is clouded by a lack of detailed information about their effectiveness in reducing emissions and congestion, the three researchers say.

Information is abundant on what project planners expect to happen before the work begins; what is needed is information on what actually happened. To ensure that the proper information is collected, however, evaluators need to determine baseline conditions, which can only be done before the project begins. The outcomes should have a bearing on air quality or congestion, either established by previous empirical study or model results. To ensure that the most appropriate data are collected and evaluated, they conclude, will require changes in the way that CMAQ is

administered and funded.

One possible reason that CMAQ projects do not receive adequate evaluation now is that the same local agencies that implement the projects bear the costs of assessing them while the beneficiaries of any lessons learned are usually other jurisdictions that are getting ready to launch similar projects. Still, the informational benefits from evaluation are likely to be large, the researchers say. Thus the CMAQ program would be well served, they argue, if public funds were set aside for project evaluation.

All CMAQ projects can yield useful information, succeeding as experiments even if they fail as transportation and air quality projects, the three write. Failing projects can provide lessons on what to avoid, while successful ones can show what should be encouraged and supported, perhaps through more permanent provisions in federal and state transportation budgets. "Only through the process of information feedback can institutional learning take place."


Scattered around the nation, the projects whose evaluations RFF assessed included a Nashville, Tennessee effort to enhance a rideshare program; the construction of bus lanes in Dade County, Florida; employee trip reduction requirements in Maricopa County, Arizona; a barge enhancement program between New York and New Jersey ports; a pedestrian connector to mass transit in Cleveland; and a freeway ser-



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vice patrol in San Francisco. Some of the evaluations of the projects were useful, the researchers found, while some could benefit from more systematic analysis along the lines suggested.

The Environmental Protection Agency's Office of Policy, Planning, and Evaluation provided support for this RFF assessment.

 Complete findings appear in "Learning from Experiments: An Evaluation Plan for CMAQ Projects," (RFF Discussion Paper 98-18). Access http://www.rff.org/disc_papers/1998.htm.

Copies may also be ordered by mail; see page 22.

New climate debates

Twice in the last eight months, RFF joined forces with the consulting group Environmental Media Services to encourage public discussion and debate about the policy implications of global climate change. Together the organizations sponsored two briefings

on the economic consequences of the climate change treaty negotiated at Kyoto, Japan in December. They geared their first briefing to "inside the beltway" environmental and policy reporters at the National Press Club in Washington, D.C. in February. An "encore" briefing took place in New York City in April.

In both instances, RFF President Paul R. Portney moderated panel debates among experts whose views vary considerably on what it will cost U.S. taxpayers to reduce the carbon emissions held responsible for heating up the atmosphere like a greenhouse.

In Washington, the panelists included William O'Keefe, executive vice president of the American Petroleum Institute; Nancy Kete, director of the climate program at the World Resources Institute; David Montgomery, vice president of Charles River Associates; and Joseph Romm, who until recently was principal deputy assistant secretary for energy

efficiency at the Department of Energy. J.W. Anderson, who is RFF's journalist in residence, observed the debate and reported the exchanges that took place.

In essence, O'Keefe argued that it will not be possible to reduce emissions of greenhouse gases as fast as the Kyoto treaty would require. Kete disagreed, citing major technological developments that will cut emissions.

Montgomery warned that the United States could not reach the Kyoto targets without major changes in lifestyles and industrial practices. He dismissed the Clinton administration's plan to spend \$6.3 billion over the next five years to accelerate technological improvements to reduce carbon emissions. In terms of meeting the targets, the effort "doesn't look nearly big enough to get us where we want to go."

Romm claimed that Americans waste so much energy that we could significantly reduce emissions just by increasing efficiency rather than limiting growth.

Portney observed that in the past business organizations have frequently overestimated the costs of complying with environmental laws. He asked O'Keefe and Montgomery whether that might not be true in this case. They responded that environmental programs are often modified in response to rising costs.

Portney then turned to the other panelists and noted that while it is possible today to buy

a 50-mile-per-gallon car, the market has swung heavily to sport utility vehicles that do not get good gas mileage. Doesn't that suggest, he asked, public resistance in moving toward greater efficiency?

Romm replied that highway efficiency in the future won't necessarily mean small cars. The high-mileage engines that emerge over the next decade, he said, will be produced for the entire range of cars and trucks.



See Anderson's complete coverage of the first debate, <http://www.weathervane.rff.org/features/feature031.html>.

Research Roundup—

A sampling of recent analyses at RFF

The cost of environmental protection

RFF researchers are helping EPA arrive at estimation methods that more completely capture the costs of complying with agency regulations. At present, when EPA responds to periodic congressional requests to report compliance costs, the agency's estimates are based largely on reports by firms of their expenditures for pollution abatement equipment, cleaner fuels, and other means of complying with the regulations.

Unfortunately, these out-of-pocket expenditures may not be a good measure of the social costs of regulation. For instance, regulations may have effects on firms or individuals

that are not monetized, such as the cost of using not-quite-as-suitable substitutes for a banned product. In such a case, expenditures would underestimate costs. But expenditures can also overestimate costs, as when reported expenditures are for goods that serve other purposes besides pollution abatement.

RFF's job is to help EPA make clear to the public and to other policymakers why expenditures and costs diverge; identify instances of such divergences; and, in those latter cases, develop more comprehensive estimates of the cost of regulations. In producing these estimates, researchers will develop methods that can be applied in other situations.

The Clinton plan on electricity

RFF Senior Fellow Timothy J. Brennan believes that the Clinton administration's "Comprehensive Electricity Competition Plan" is a productive step toward restructuring the large and vital electricity sector. The plan, announced by the Department of Energy in March, proposes a set of principles to extend to households and businesses the benefits of open markets in electricity. It recognizes the importance of maintaining system reliability, preventing monopolistic behavior, keeping consumers informed, and adapting environmental policies to a more competitive industry.

The proposal does have

some questionable aspects, Brennan notes. He would prefer a lighter federal role in implementing retail competition and questions whether opening markets justifies stricter and more expensive environmental protections. But considering the technological complexities, political pressures, and money at stake, Brennan concludes that, on balance, the plan is a good contribution to expanding the role of competition in the generation and sale of electric power.

Inducing energy-efficient innovations

Which approaches are most effective at encouraging energy-saving innovations? Energy taxes and efficiency subsidies? Information programs and product labeling? Minimum efficiency standards? Both energy prices and government regulations have had a significant impact on energy-efficient innovations over the last four decades, according to RFF Fellow Richard Newell and his colleagues.

Newell and co-authors Adam Jaffe (Brandeis University) and Robert Stavins (Harvard University) found that between one-quarter and one-half of the improvements in the energy efficiency of new air conditioners and gas water heaters were associated with rising energy prices since 1973. This responsiveness to price signals increased substantially, they found, after manufacturers of appliances were required to label their products with ener-



gy-efficiency information. Minimum efficiency standards also were found to have had a significant positive effect on average efficiency levels, although much of this effect is attributable to the elimination of inefficient models as opposed to the introduction of new models.

Turning to an unusual source for data, the researchers combed Sears, Roebuck and Company catalogues from 1958 through 1993 to compile much of their information about appliance efficiency and other characteristics.

Climate change negotiations

Progress toward an enforceable treaty on greenhouse gas emissions is falling behind schedule as policy quarrels deepen. The June negotiating sessions in Bonn demonstrated as much, according to J.W. Anderson, RFF's journalist in residence. Anderson reviews the issues that were advanced and outlines the items that international negotiators still need to consider before the next United Nations climate meeting in Buenos Aires in November. Despite the slow pace, Anderson concludes, the present rate of progress is not meaningless. It was simply unrealistic to think that a global climate change treaty could be effected at Kyoto in the first place.

Climate change and health

Changes in greenhouse gases in the atmosphere may result in warmer air and ocean tem-

Facts for Thought

An occasional presentation of data about energy, natural resources, the economy, and the environment

Top Ten U.S. Corporations as Measured by Market Capitalization,* 1988 and 1998

1988			1998		
Rank	Company	Market capitalization (in billions of \$1998)	Rank	Company	Market capitalization (in billions of \$1998)
1	IBM	88	1	General Electric	260
2	Exxon	75	2	Microsoft	199
3	General Electric	52	3	Coca-Cola	185
4	AT&T	40	4	Exxon	159
5	General Motors	29	5	Merck	157
6	Phillip Morris	29	6	Intel	128
7	Ford	29	7	Pfizer	114
8	Merck	27	8	Wal-Mart	114
9	DuPont	27	9	Procter & Gamble	114
10	Amoco	25	10	Bristol-Myers Squibb	106

*The number of shares of stock in a company multiplied by the price of a share on a given date

Source: *Fortune* 4/25/88; *Fortune* 4/27/98

Times change, and with them the fortunes of the country's largest corporations. Only three of the "most valuable" corporations in 1988 made the top ten in 1998. In the latter year, three pharmaceutical firms—Merck, Pfizer, and Bristol-Myers Squibb—were among the top ten companies in the United States. So were Intel and Microsoft, the latter not even a Fortune 500 firm in 1988. So rapid has been the growth of Microsoft and the equities market in general in fact that, even after adjusting for inflation, its market value in 1998 is greater than the combined value of the first, second, and fifth firms in 1988. Changes like these may presage changes in the focus of regulatory and other economic policies.—Paul Portney

peratures. These changes could increase heat-related deaths and the incidence of infectious diseases. However, before we take responsive action, Senior Fellow Alan Krupnick observes, we should understand and compare the risks and response costs involved. To improve the quality of the data we rely on, Krupnick recommends the use of economics. The value people place on reduced health threats can be estimated, for example, and compared with the costs of various risk-reducing actions.

Economic analysis can also help us determine what share of resources should be directed toward improving public health; better estimate the costs of a disease outbreak that may be related to climate change; and better design health and environmental surveillance and monitoring systems.

Climate change and foreign investment

RFF Fellow Allen Blackman and former RFF intern Xun Wu are studying foreign direct investment in the Chinese

power sector to see what impact it has on greenhouse gas emissions. Based on a survey of U.S. firms with investments in China, their investigation suggests that some Chinese policies may reduce the potential for foreign direct investment to improve energy efficiency and reduce greenhouse gas emissions.



For more information on these research projects, contact RFF Public Affairs Manager Michael Tebo at 202-328-5019; tebo@rff.org. Also visit RFF's web site at <http://www.rff.org> to access related reports.



Marketing Water

The Obstacles and the Impetus

by *Kenneth D. Frederick*

As water grows more precious, so do the incentives—and the innovations—to try to apply market principles to its use and management.

Water is becoming increasingly scarce in the United States. Demand is rising along with population, income, and an appreciation for the services and amenities that streams, lakes, and other aquatic ecosystems have to offer. In contrast, the options for increasing supplies are expensive relative to current water prices and often environmentally damaging. Furthermore, contamination and unsustainable rates of groundwater use threaten current supplies in some regions.

Ordinarily, Americans count on prices and markets to balance supply and demand and allocate scarce resources. When demand increases faster than supply, higher prices provide incentives to use less and produce more. And, as conditions change, markets enable resources to move from lower- to higher-value uses. Market forces, however, have been slow to develop as a means of adapting to water scarcity. Both the nature of the resource and the institutions established to control its use help explain why.

Market Obstacles

Efficient markets require that buyers and sellers bear the full costs and benefits of transfers. But interdependencies among the many users of a stream or aquifer make that difficult to do. Selling water rights, for example, is likely to alter the quantity of water in a stream or the location of a diversion or returnflow (water withdrawn from a stream or aquifer that is returned to a location where it can be used again). Third parties—people benefiting from the water other than the buyer and seller—will be affected by the change. Third-party impacts might include a change in the recreational amenities provided by a free-flowing stream or the erosion of a rural community's tax base when a farmer sells water to a city.

Efficient markets also require well-defined, transferable property rights. But riparian rights, which are still the principal basis of water law in the Eastern United States, are poorly defined because water use is subject to regulatory or judicial interpretations as to what is reasonable or might unduly inconvenience others. Moreover, these rights are not directly marketable because they are attached—and their use is restricted—to the lands adjacent to a stream.

In the West, where streams are less common and flows are smaller and less reliable, "prior appropriation" quickly displaced riparian rights as the primary basis of water law. Appropriative rights are established by withdrawing water from its natural source and putting it to beneficial use. During drought, supplies are allocated according to the principle of "first in time, first in right." This principle provided a powerful incentive for the quick diversion of streamflows and allowed irrigators to acquire the highest priority rights to much of the water. While appropriative rights can be transferable, they are commonly attenuated in ways that limit how and where water can be used.

Water has traditionally been treated as a free resource to be harnessed to serve cities, factories, and farms. Anything less was seen as wasteful. Thus, subsidized water storage and distribution systems and irrigation projects contributed to a nine-fold rise in water withdrawals from 1900 to 1970. They also contributed to the loss of tens of thousands of miles of once free-flowing streams and, eventually, to a shift in national policy. To protect streamflows and recover forgone environmental and recreational values, Congress passed legislation such as the Wild and Scenic Rivers Act of 1968, the National Environmental Policy Act of 1969, and the Endangered Species Act of 1973.

In recent decades, these environmental laws have been used to block construction of many dams and in some cases to challenge previously established rights to divert water from streams and lakes. Domestic, industrial, and agricultural users continue to vie for water that is withdrawn from reservoirs and streams, and now all three groups must also vie with environmentalists and recreationists over how much water can be diverted. Conflicts also arise over the priority that dam managers should give to flood control, water supplies, hydropower production, fish habitat, and recreational opportunities. These conflicts are now generally played out in the courts or administrative proceedings rather than in the marketplace.

Overcoming the Obstacles

If water has been slow to be bought and sold like other commodities, the incentives to do so are strong. Most of the senior water rights in the arid and semi-arid West are held by farmers and irrigation districts. They pay nothing for the water itself and generally only a modest amount to have it delivered to their farms. As a result, enormous amounts of water are applied liberally to relatively low-value crops and the marginal value of the water is likely to be well under \$50 an acre-foot (af)—the quantity of water that will cover one acre to a depth of one foot. In some cases the value of the water could be increased simply by leaving more in the river to provide hydropower, fish and wildlife habitat, and recreation rather than diverting it for irrigation. In many other instances, the value of water would rise by selling some of it to urban areas that are spending more than ten times as much to augment supplies through recycling or other costly water projects.

Despite the obstacles, the impetus to move from lower to higher value use is driving some water transfers. Temporary transfers are becoming increasingly common to respond to short-term fluctuations in supply and demand. Precisely because they are temporary, short-term leases, options to purchase during dry periods, and one-time purchases through water banks blunt a principal third-party concern that a transfer will permanently undermine the economic and social viability of the water-exporting area.

Transfers among farmers within the same irrigation district are common and relatively easy to arrange because the third-party impacts are likely to be small

and positive when the water stays within the community. But when farmers want to sell water to cities, irrigation districts resist, fearing the loss of agricultural jobs and income that accompanies rural water use.

A water bank provides a clearinghouse to facilitate the pooling of surplus water rights for temporary rental. If well-defined, its rules and procedures can reduce the costs and uncertainties associated with a transaction and increase the opportunities for both buyers and sellers.

California established emergency Drought Water Banks in 1991, 1992, and 1994 to reallocate water among willing buyers and sellers. Water purchased largely from farmers willing to idle land or pump groundwater rather than divert surface water for irrigation was sold to cities and farms or used to protect water quality in the state's delta region and meet instream fish needs. Any adverse third-party impacts on the water-exporting communities were probably insignificant compared with the overall benefits of moving water to higher-value uses. Sales exceeded \$68 million in 1991; they averaged less than \$11 million in the latter years when drought conditions subsided. Idaho and Texas have established permanent water banks and other states are now considering establishing them as well.

Transferring Permanent Water Rights

Temporary water transfers are particularly useful for adapting to short-run changes attributable to such things as climate variability. They are less effective in dealing with long-term imbalances between supply and demand resulting from changing demographic and economic factors, social preferences, or climate. At some point, the historical allocation of water becomes sufficiently out of line with current conditions to warrant a permanent transfer of rights.

The process of resolving the third-party issues associated with the transfer of a long-term shift in water use is often slow, costly, and contentious. Proposed transfers face the hurdle of proving the negative, that a change will not harm others. This requirement stifles the development of markets in water rights. The Colorado-Big Thompson project (described in the sidebar), which has been able to avoid third-party issues, is the exception. The ongoing efforts (described below) of the coastal region of Southern California and the city of Las Vegas are more

indicative of the obstacles to acquiring additional water.

Both of these geographic areas face the challenge of meeting growing demands for water at a time when their traditional sources are declining and environmental considerations restrict the development of new ones. Los Angeles has already been forced to reduce the amount of water it takes from the Mono Lake region and, to comply with a mandate to improve environmental conditions in Owens Valley, will have to further reduce the city's supplies. In addition, the Southern California Metropolitan Water District (MWD), a large water supplier servicing more than fifteen million consumers including the residents of Los Angeles, is losing access to surplus water (that is, unused entitlements of other states) from the Colorado River. Las Vegas, meanwhile, has been depleting its groundwater stocks, causing subsidence within the city.

Under a 1989 agreement, Southern California's MWD has invested more than \$100 million in lining irrigation canals and other water conservation projects in the Imperial Irrigation District. In return, MWD received the right to use the conserved water, approximately 106,000af per year, for at least thirty-five years. Provisions were introduced to assure that neighboring irrigation districts in the United States did not lose their water rights as a consequence. But the impacts on irrigators across the border where groundwater recharge declined were ignored because the Mexicans lack a legal claim to the water.

San Diego receives about 90 percent of its water from the MWD and, as a junior claimant, is the first to be cut back in time of drought. To increase the quantity and reliability of its supplies, the San Diego Water Authority has agreed to fund additional conservation efforts in the Imperial Irrigation District in return for the conserved water. As originally proposed, 20,000af would be transferred in 1999, with the annual quantity increasing to 200,000af after ten years. Disputes with MWD over use of the Colorado River Aqueduct to transport the water, however, have delayed completion of the transaction.

Las Vegas, which is already using most of Nevada's legal entitlement to the Colorado River, is seeking to buy more shares of the river from states with unused entitlements. Legal issues have undermined earlier proposals for interstate and interbasin sales of Colorado River water and enabled Southern

Trading Water

The Bureau of Reclamation's Colorado-Big Thompson project brings an average of 230,000 acre-feet of water annually from the Colorado River Basin across the continental divide to northeastern Colorado. Rights to proportional shares of this water are traded actively within the Northern Colorado Water Conservancy District unencumbered by third-party concerns.

Under western water law, downstream users generally own the rights to the returnflows. But in this case the district is able to retain ownership of the returnflows because the water originates in another basin. As a result, rights to the water are traded within the district much like stocks in companies. This arrangement does not eliminate the third-party impacts associated with returnflows, only the need to consider them in transfer decisions. The benefits of being able to transfer water readily among agricultural, municipal, and industrial users exceed any likely third-party costs.

However, limiting sales to within the conservancy district precludes opportunities for even more profitable transactions. For example, an acre-foot of water in perpetuity has sold for \$3,500 more in the neighboring Denver suburbs than in the conservancy district.

California's MWD to take unused entitlements for free. Rising water values, however, are creating new interest in such sales in Nevada, which lacks rights to surplus flows, and in states wanting to benefit from their unused shares.

In 1996, Arizona established a Water Banking Authority to purchase their own unused Colorado River water for storage in groundwater basins and possible sale to California and Nevada. Interstate sales, however, are tightly restricted; they are limited to 100,000 af/year and only when there is no use for the water in Arizona and there are no shortages on the Colorado River.

Las Vegas is also interested in buying water from Utah, which has not been using its full entitlement. However, a transfer between an upper basin state (Utah) and a lower basin state (Nevada) could require renegotiation of the 1922 Colorado River Compact dividing the river between the two basins.

The Federal Role

State institutions are primarily responsible for allocating waters within their borders. But the federal government—manager of much of the West's surface waters, supplier of water to about 25 percent of their irrigated lands, the source and enforcer of environmental legislation affecting water use, and trustee for Indian water rights—also has a critical role in breaking down the institutional obstacles to permanent water transfers. Some steps in this direction have been taken.

- In 1988, the Department of Interior adopted a policy of facilitating voluntary water transfers involving federal facilities as long as the transfers comply with federal and state law, have no adverse third-party impacts, and do not adversely affect facility operations.
- The Central Valley Project Improvement Act of 1992 authorized the transfer of federally-supplied water outside the project service area. Although no off-project transfers have been approved yet, the act is potentially significant because the project is the largest water storage and delivery system in California and most of the project water is allocated to agriculture under highly subsidized terms.
- A proposed federal rule from the Department of Interior (*Federal Register*, December 31, 1997) is designed to encourage and facilitate voluntary transactions among the three Lower Colorado River Basin states by establishing a framework for approving and administering interstate agreements.

- In addition, the federal government as well as some states have been acquiring water for environmental purposes, such as the preservation of endangered species. These purchases help establish markets as viable mechanisms for allocating water.

More steps are of course needed. Uncertainties surrounding large but unquantified Indian water claims, for example, hinder the assignment of clearly defined, transferable property rights in water. Providing the tribes with rights that could be sold for uses off the reservations would foster water marketing as well as tribal welfare.

Finally, water scarcity and the potential benefits of water marketing are not limited to the West. In the East, riparian rights are gradually being replaced by or supplemented with permits. The advantages of using markets to allocate these permits will grow as the resource becomes increasingly scarce. Indeed, auctioning and trading permits are innovative approaches that might facilitate a more efficient allocation of water. It is unlikely, however, that markets resembling the ones we use to allocate most goods and services will ever become commonplace to transfer water. Finding expeditious ways to deal with the third-party effects that plague nearly all water rights transfers is critical if traditional market forces are ever to thrive. In the meantime, the enormous potential benefits of water marketing still wait to be tapped.

Kenneth D. Frederick is a senior fellow in RFF's Energy and Natural Resources Division.



On the Way to Retail Competition

by Amy W. Ando and Karen L. Palmer

The transition to retail competition in electricity is far from complete. It is encouraging (and perhaps not surprising) that the states that have decided to adopt competition thus far may be the ones that can benefit the most from having done so.

The \$210 billion U.S. electric power industry has traditionally operated as hundreds of regulated monopolies, but it is now opening up to competition. Just as households and businesses select their carriers for long-distance telephone calls, soon they may be able to select their suppliers of electricity as well. However, unlike interstate long-distance telephone service (which was regulated by the federal government), retail electric service is regulated at the state level, generally by a state public utility commission (PUC). As a consequence, the transition from regulated to competitive electricity markets is moving at different speeds across the different states.

What accounts for the different rates at which states have moved to consider and then commit to creating competitive retail markets for electricity? We conducted the research described here to investigate whether and how certain features of the markets—as well as the decisionmakers and interest groups—influence how long a given state will take to decide to open its retail market for electricity to competition.

Why Competition?

The movement toward more competitive electricity markets is being driven largely by two factors. First, as

a result of recent developments in generation technology, small natural-gas-fired generators can produce power less expensively than large-scale generators, making competition in generation economically feasible. Second, the prevailing perception among industry observers is that the existing regulatory system has failed to keep prices as low as possible. This perception is fueled by substantial differences in electricity prices across states, and even among utilities within a state. In 1993, when discussions about retail competition began to take off, average electricity prices ranged from a low of 3.7 cents per kWh in Washington State to a high of 10.8 cents per kWh in New York and New Hampshire.

Further evidence that regulation has not performed well in keeping electricity costs and prices low are the estimates of the so-called “stranded costs” of doing business that utilities have incurred but would be unable to recover if electricity were priced competitively. Under competition, electricity prices will be set in the market; due in part to the entry of low-cost suppliers, market-determined prices are expected to be lower than current regulated prices charged by many high-cost utilities. While regulated prices are set high enough to provide sufficient revenue to cover “sunk”

costs—expenditures that utilities have already made or agreed to make—competitive prices may well be too low to cover these costs. Shareholders of the affected utilities could thus see the value of their stocks fall. The most oft-cited estimates of industry-wide stranded costs are in the \$100 to \$200 billion range.

Motivation for Analysis

Several reasons make it worth understanding why some states are moving quickly toward full retail competition while others are not. The industry's reformation may well have some significant impacts on the nation's economy and environment. Yet without knowing how rapid or widespread the reformation will be, scholars and policymakers are hard-pressed to predict the nature and size of those impacts. Taking a close look at some of the factors that influence decisions to permit retail competition may help us to anticipate the shape of the industry to come.

Research may also inform the current debate as to whether the country needs a federal retail competition policy. Our model of the state policymaking process affords a glimpse of how the process might continue to unfold, absent any federal mandates. Furthermore, insights as to which interest groups have the greatest influence on the rate of progress toward a retail competition plan should help clarify the politics surrounding such decisionmaking and perhaps help policymakers assess how realistic the implementation deadlines in a given plan might be.

Decisionmakers and Stages of Progress

In almost every state, the regulator (usually in the form of a public utility commission) and the legislature can take separate action to push forward retail competition. Thus in the analysis reported here, we looked separately at the progress toward retail competition of the two decisionmaking bodies.

We broke the decisionmaking process down into three transitional stages that regulators and legislators each might pass through on their way to implementing retail competition. These stages of progress are defined as follows: having taken no action on the issue at all; having begun formal consideration of the possibility; or having made a final decision to implement competition.

To perform our analysis, we collected monthly data on the stages of progress reached by individual state

utility commissions and state legislatures between January 1993 and December 1997. Our source of data was the "Retail Wheeling and Restructuring Report," a state-by-state accounting of government and utility activities related to retail competition published quarterly by the Edison Electric Institute. We developed indicators of regulatory progress for the District of Columbia and all fifty states except Nebraska, where the electric utilities are all publicly owned. We also formed indicators of legislative progress for all fifty states except the District of Columbia, which has no legislative body with authority analogous to that of a state legislature. (For a complete description of our analytical process, see RFF Discussion Paper 98-19REV; ordering information is described at the end of this article.)

Factors Affecting Legislative Decisions

Our analysis indicates that legislators in different types of states are responding to different interest groups. All else equal, legislators in states with high electricity prices, for example, are moving more quickly than those in other states toward consideration of retail competition. These legislators appear to be responding to pressure from electricity consumers, particularly industrial consumers, who stand to gain from lower electricity prices expected to result from retail competition. New and potential market entrants, including low-price, independent power producers and power marketers, may also be pushing for competition in high-price states. Our results show that, if electricity prices had been 20 percent lower in 1993 across all states—as a result, for example, of more effective regulation—state legislatures would have taken over seven months longer on average to consider restructuring. In other words, they would have been slower to consider competition.

At the same time, and perhaps counterintuitively, legislators in states where the price of power is lower than in neighboring states are also moving quickly toward consideration of retail competition. In such states, utilities are the ones that stand to gain from greater competition, as it will enable them to profit by exporting their power to customers in neighboring high-price markets. Consumers in the low-price states might rightfully fear that their own low rates would rise as out-of-state customers bid against them for local low-cost electricity. However, our analysis implies that utility pressure in support of opening up markets

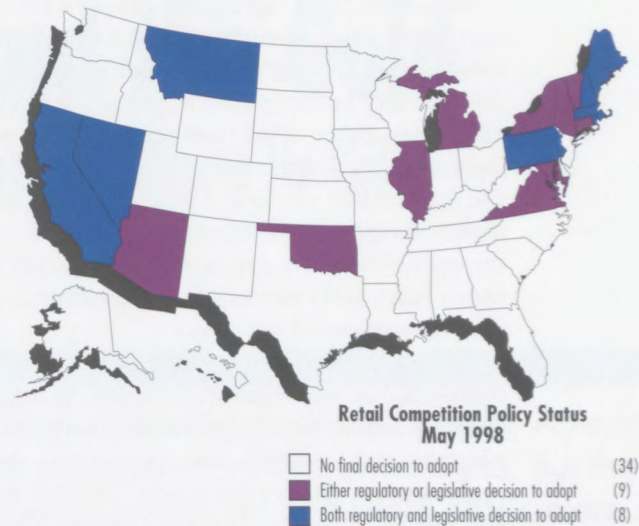
seems to overwhelm any opposition. This interest-group pressure may help explain early decisions to adopt retail competition in states where electricity is inexpensive, such as Montana and Oklahoma.

A third factor that seems to influence state legislators to consider retail competition more quickly is the presence of a high stranded-cost burden. However, it is unclear whether this represents a triumph for consumers or utilities, since it is hard to say which group will benefit more in the long run from moving to competition in states where stranded costs are high. In the early stages of the restructuring debate it was uncertain whether legislators and utility regulators were going to allow utilities to recover stranded costs. As a result, utilities with high stranded-cost burdens resisted moving toward competition. As it has turned out, however, most states that have adopted competition have decided to allow virtually complete recovery of stranded costs. Thus, affected utilities will not be greatly harmed by competition, and may even benefit if they recover their costs more quickly or more completely than they would have under traditional regulation. On the other hand, such recovery provisions will erode much of the benefit of competition to consumers—at least in the short run—since prices will be artificially elevated during the period of stranded-cost recovery.

Legislators seem to be responsive to some consumer pressures once retail competition has received serious consideration. In particular, legislators in states whose electricity prices are higher than in surrounding states tend to move more quickly than they otherwise would toward a commitment to competition, since customers in those states stand to save by importing power. However, legislators in states with powerful environmental constituencies seem to work slowly to turn retail competition bills into laws. Under competition, the generation sector will be subject to less regulatory oversight and utilities may be less willing to invest in renewable generation technologies and energy conservation programs designed to reduce pollution. Hence, environmental advocates want to make sure that final retail competition laws include provisions for further environmental protection; these concerns seem to have slowed final legislative action in some areas.

Factors Affecting Regulatory Decisions

In our analysis of regulatory decisions, we found that many of the same factors influence regulators as legis-



By now, every state in the union could have passed legislation and/or set out regulations opening retail electricity markets to competing suppliers and requiring local distribution companies to transmit and deliver electricity to all market comers. However, as the map indicates, most states have yet to decide whether to implement retail competition.

lators. Like their legislative counterparts, regulators move more quickly to consider retail competition in states with higher prices than their neighbors, responding to pressure from consumers for lower electricity prices. Similarly, regulators are quick to consider retail competition in states where prices are particularly low compared with neighboring states; like legislators, regulators appear to be responsive to pressures from low-cost utilities to take steps that may increase their opportunities to export electricity profitably. Regulators are also likely to have progressed further toward retail competition in states where stranded costs are high.

Unlike legislators, however, regulators are sensitive to differences in average electricity prices among the different utilities within a state, according to our findings. Electricity consumers may have a difficult time accepting high electricity prices when utilities in other regions of their own state charge substantially lower prices. Thus regulators, keenly aware of these differences in prices that, for the most part, they endorsed, appear more eager to move toward competition when price differences across utilities within the state are large. Our analysis suggests that if the price variation within each state were cut by half, regulators would delay considering retail competition by more than six months on average.

Regulators move more slowly toward retail competition in states where municipal and rural-cooperative utilities provide a large portion of the electricity. This slowness may be attributable in part to the fact that, in most states, public utility commissions do not regulate these publicly owned utilities. Thus, unlike a legislative decision that can cover a state's entire electricity market, a regulatory decision to proceed with retail competition will have a more limited impact in a state with a heavy concentration of publicly owned—rather than investor-owned—utilities.

Industrial customers may have more influence over regulators than residential; PUCs appear to commit sooner to retail competition in states where industry is a big part of the customer base. Our analysis also suggests that regulators that are elected rather than appointed are more likely to make concrete plans to replace the current regulatory system. This finding may reflect the fact that, unlike appointees, elected officials must answer directly to a public filled with electricity consumers.

Who Wins the Political Battles?

Under what circumstances does retail competition for electricity have the greatest potential to be socially beneficial? High prices and costs are often signs of technical and/or managerial inefficiency that could be driven out of the market by the pressures of competition. Also, price variation in a reasonably small geographic area tends to mean that the market is not divided efficiently among suppliers. If price variation exists, social welfare could be improved by shifting more consumers to suppliers that currently charge low prices. Eventually, the redistribution of sales would reduce the gaps among the prices.

In the political battle over whether to institute retail competition, there are often potential winners and losers. One interesting feature of our findings is that no particular interest group always wins the battle. Instead, the victor tends to be whichever group is on the side of a change that will produce a net improvement in the well-being of society. For example, a state whose prices are either much lower or much higher than its neighbors seems to move relatively quickly toward retail competition. In either case, the move is likely to increase the society's well-being overall. When a state stands to become an exporter of electricity, however, investor-owned utilities will bene-

fit at the expense of in-state customers who may eventually pay higher prices; on the other hand, when the state is likely to import electricity, its consumers will have prevailed over the local high-priced utility.

Conclusions

Because so few states have reached the final decision stage, our analyses of the processes by which public utility commissions and legislatures reach final decisions regarding retail competition are tentative. However, these early results suggest that, in the absence of a federal policy mandating retail competition in all states, we may expect to see PUCs in states with high prices, large price differentials with neighboring states, or large industrial customer shares move more quickly toward a final decision to adopt retail competition than states with the opposite characteristics. Appointed PUCs are likely to move less quickly toward competition than elected PUCs, and legislatures may drag their heels in states with powerful environmental constituencies.

The state-level transition from regulated to competitive retail electricity markets is far from complete. As the deregulatory process continues to unfold and more states adopt final retail competition plans, additional data will become available. This information will make possible more detailed and robust analyses of these decisionmaking processes. Nonetheless, even our current results based on intermediate snapshots of the process provide useful and encouraging evidence that the states that have committed to make the change to retail competition may be the ones that can benefit the most from it.

Amy W. Ando and Karen L. Palmer are fellows in RFF's Quality of the Environment Division.



To download a copy of their related paper, "Getting on the Map: The Political Economy of State-Level Electricity Restructuring," (RFF Discussion Paper 98-19REV) access http://www.rff.org/disc_papers/PDF_files/9819rev.pdf. Copies may also be ordered by mail; see page 22.



The Green and the Gold

How a Firm's Clean Quotient Affects Its Value

by David Austin

Can companies actually profit from operating clean and green? A review of the available statistical evidence suggests that the answer is yes. But the relationship of cause and effect between investment and profit needs more study.

Can business firms increase their profitability by reducing the polluting emissions that their activities produce—that is, can they “do well by doing good”? Anecdotal evidence suggests that the answer may be yes. Many firms have found that they can profit from their efforts to operate in an environmentally sound fashion, and so the debate is not merely of academic interest. However, because much of the case for making gold from green investments is anecdotal, it is not clear how widespread the phenomenon actually is, and under what circumstances firms are managing to improve their bottom lines by reducing or preventing pollution.

This article introduces what evidence can be found in empirical studies on the sources and scope of positive returns to firms from their investments in “green” business practices. The available studies reviewed here are statistical in nature, which is appropriate, since statistical evidence is necessary to assess the generality of increased market value through such investments. The studies are not, however, about cost-saving investments or process changes. Instead, they focus on the financial performance of green firms and how capital markets revalue firms when information about their environment-related performance has changed.

An assemblage of the statistical evidence not only gives a sense of the payoffs from improving environmental performance, but may also shed light on the controversial assertion that firms stand to gain from still stricter environmental regulations. A survey is

useful too in suggesting where more research is likely to be productive.

The Market and Information

The environmental performances of U.S. firms affect their bottom lines now more than in the past. (In some cases this is true of foreign firms as well.) One reason is that government agencies require companies to report much more information about their environmental records than ever before. Thus, investors can better distinguish between firms—in how they perform environmentally and what risks they face. At the same time, this abundance of information puts firms' reputations more at stake. Both factors suggest that the market values of firms reflect the new environmental information. What is the evidence that this assumption is correct?

Securities people are clear that they do use this information. Half of the respondents to a recent National Wildlife Federation Global Survey of the financial services sector, for example, indicated that the financial markets have begun placing greater emphasis on environmental screens in their commercial credit decisions. Thus firms' environmental performance should affect their cost of capital, and so their market values. A recent collaborative study by researchers at the RAND Corporation and the Harvard School of Public Health likewise shows that firms named as potentially responsible parties at multiple “national priority” Superfund sites had capital costs

about three-tenths of a percent higher than they otherwise would have been. (Citation information for all of the studies mentioned in this article is available from the author.)

Other researchers have been able to show that capital markets reacted strongly to the Environmental Protection Agency's initial Toxics Release Inventory report, issued in 1989, even though the releases that the TRI lists are legal. Same-day losses in market value when the TRI came out averaged two- to three-tenths of a percent for a sample of over 400 firms on the list. A firm's loss increased with the number of toxic chemicals it handled, and losses were higher again by half for firms that also were potentially responsible parties at Superfund sites. The losses were not large, averaging between \$4 and \$6 million in the total market value of the companies—but they may have been enough to change firms' behavior: the firms with the biggest losses in value that day were the ones that reduced their TRI emissions the most over the next three years. Why did the market devalue these firms in the first place? Possibly because of expectations that the firms would face higher future liabilities, or higher regulatory compliance costs, or some loss of goodwill on the part of the public.

A related study compared the values of several hundred firms. After accounting for differences in advertising, research and development, sales, industry sector, and other factors relating to market value, it was found that two otherwise identical firms differing only in that the TRI emissions of one were 10 percent higher than the other's would differ in market value by some \$30 million on average. In industries with significant pollutant emissions, this difference was higher still.

Markets obviously react to environmental accidents. When the *Exxon Valdez* ran aground, Exxon's market value fell immediately in response to an expectation of fines, cleanup expenses, and a loss of revenue and goodwill stemming from consumer backlash. This experience might suggest that firms engaged in environmentally risky activities stand to profit from taking greater care. In fact, though, the payback will depend on the existing level of care, because costs rise at an increasing rate with firm effort. The real point of mentioning the *Exxon Valdez* is to reveal how the market revalued *other* oil companies in the wake of the accident. It turns out that their values also declined, according to their levels of dependency on oil from the

Trans-Alaska Pipeline. Companies that were only marginally dependent on Alaskan oil were barely affected.

Thus it appears from these studies that the capital markets are fairly efficient at processing information about exposures to environmental risk. Evidence suggests that markets in Europe, South America, and Asia make similar use of environmental performance data in those parts of the world.

The Market and Regulation

Another reason for surmising that a firm's environmental performance may increasingly affect its profit margin is that regulations are more stringent than they used to be. This stringency has raised the cost of toxic inputs to production. So reducing the use of toxics lowers costs more than it used to. Poor environmental performers will need to devote more of their future capital to compliance than good performers will. And they will run an increasing risk of lawsuits, fines, or loss of goodwill. Other things equal then, firms that perform better environmentally will perform better financially than other firms, or at least no worse. (The same should be true of firms that avoid environmental lawsuits and fines.) What evidence is there to support this hypothesis?

One study, using data from the Investor Responsibility Research Center, compared the financial performance of two portfolios of firms in the Standard & Poor 500. The two portfolios were balanced with respect to industry sectors, with the difference being that one featured firms scoring above their industry's median on various measures of environmental performance while the other contained only below-median firms. For each of nine measures, the "green" portfolio performed at least as well as the "brown" one, and slightly better on some of the measures. Of course, the green firms might have been healthier financially to begin with.

The study provided tentative support for the hypothesis that lagging environmentally can carry a market penalty. Firms whose TRI releases were above their industry median experienced several years of subpar returns on assets. Moreover, similar results from cross-sectional studies suggest at least a slight negative relationship between a firm's book value and the amount of its most environmentally significant emissions, such as the total biochemical oxygen demand discharged by paper and pulp firms.

Interestingly, however, the portfolio study also

revealed the capacity of some firms to go from brown to green, given sufficient incentives. Firms that were above the overall median for TRI releases in the initial list experienced subpar returns over the next few years, but by the third year had 60 percent higher returns on assets, on average, than the cleaner, below-median TRI firms. In other words, the higher emitters seem to have done a good job of reducing emissions, and may have discovered cost savings along the way.

Which kinds of firms have successfully reduced their TRI emissions? Identifying them might suggest where, or at least with whom, the most cost-effective environmental investments lie. According to another group of studies, within any particular industry firms with high TRI emissions tend to be those involved with Superfund sites or those with high sales volumes or those with aging asset structures. Meanwhile, the firms that have been most successful at lowering their toxic emissions have tended to be large emitters, but in industries that are below-average toxic releasers; large, high-revenue, publicly owned firms, especially in concentrated industries; and especially firms with less-constrained cash flows. In other words, they are high-profile toxic releasers with the opportunity, the means, and the incentive to reduce their pollution quotients. In particular, they are firms whose shareholders can and will pressure them to clean up their acts when they lag behind the environmental performance standards of other firms in their industry.

The Role of Regulation

Quite apart from these studies, some people—including Michael Porter of the Harvard Business School—have concluded on the basis of suggestive anecdotal evidence, that strict environmental regulations can benefit U.S. firms financially and so should be ratcheted up further. Since companies stand to profit by complying with tougher reporting requirements and more stringent environmental standards, the reasoning goes, why not raise the stakes?

The “profit through regulation” argument, though, turns on whether regulators can *as a rule* help firms identify profitable green investment opportunities. Proponents say that regulators can spot profit opportunities that firms might miss, while economists tend to be skeptical. Economic models, several produced at RFF, are clear that only under special circumstances would widespread profit opportunities arise from

tightened environmental regulation. The available data seem to back this up: reported expenditures on mandated pollution abatement and control outweigh any resulting cost savings by about fifty to one. (The “portfolio” study cited earlier compares overall returns for firms with better- versus worse-than-average environmental performance. Here, only firms’ direct pollution abatement costs and savings are compared, without consideration of environmental performance. The results are not directly comparable.)

Economic models and indirect statistical studies suggest that claims of nonenvironmental benefits of environmental regulations—competitiveness or financial performance primarily—should be scrutinized carefully, and should not, at this point, be accepted as strong arguments in favor of further regulations. These benefits may indeed occur in some instances. The evidence needed, however, to substantiate their existence has not yet surfaced. The kind of study that might succeed in producing such evidence might be an “event study” that examines the effects of announcements of new or proposed environmental regulations on the market valuation of the affected firms. This study would estimate the regulatory effects on firm profits that the capital markets expect to occur.

Cause and Effect Next

So what do these studies tell us, and where do we go from here? In sum, they suggest that markets are reasonably efficient at pricing business environmental practices in terms of market risks. The body of research described here also suggests that firms are not penalized by the market for their green investments. What’s more, the studies to date suggest that out of concern for their reputations, or pressure from their shareholders, firms may improve their environmental performances when they are not as good as those of their competitors.

Where we see environmentally sound firms performing well on financial measures, though, we still do not know which is cause and which is effect. This question is amenable to further study to see if the direction of causality between green performance and gold performance can be established.

David Austin is a fellow in RFF’s Quality of the Environment Division, email austin@rff.org. This article is based on remarks delivered at the RFF Council Meeting this past April.



Marion Clawson's Long View of the Land

When Marion Clawson died this past April at the age of ninety-two, RFF and the world lost a provocative thinker, known for his pragmatic approach to public land policy—as well as for his cantankerous brand of charm. Clawson was among the first generation of RFF research fellows, joining the staff in 1955, just a few years after the first Ford Foundation grant to the organization. He set a standard—and perhaps a record—for the study of agriculture, park and forest use, outdoor recreation, and land development that spanned seventy years. His interest in the land seems only natural, considering that he was born in Nevada in 1905 and raised on ranches and in small towns in that state.

Over his long career, Clawson was able to observe how we Americans have sparred and shifted in our emphasis and influence over the nature and purpose of national forests, national parks, and wildlife refuges. Methods he developed to measure the demand for and value of outdoor recreation have formed the basis of several hundred studies throughout the world. A doer as well as a thinker, he directed studies of irrigation development out West for the Department of Agriculture's Bureau of Agricultural Economics in the 1930s and '40s and then ran the Department of Interior's Bureau of Land Management in the late 1940s and early '50s before coming to RFF.

Clawson was a prolific writer, at one point, publishing twenty books in twenty years, including the widely read *Economics of Outdoor Recreation* (1966) and *Forests for Whom and for What?* (1975), not to mention *Uncle Sam's Acres* (1951) and *Federal Lands: Their Use and Management* (1957), which are classics on public lands history and administration.

Those who encountered Clawson in

person could expect to hear opinions expressed with no nonsense and sometimes a tart tongue. Probably no one was more outspoken on forest policy than he was when economist Robert G. Healy and land use planner William E. Shands interviewed him for the *Journal of Forestry* in 1989. Excerpts from that interview, and from another that appeared in *Resources* in 1995, help explain why he has been called



FABIAN BACHRACH

a "bull elephant" and a "true giant," if not necessarily in that order.

In his conversation with Healy and Shands—and in his book *The Federal Lands Revisited* (1983)—Marion noted some striking changes in public attitudes in the thirty-six years that had passed since he directed BLM. An enormous increase, he said, had taken place in the number of people concerned about public land and the environmental problems associated with forest harvesting, insecticide use, and water pollution on those lands. He noted,

too, a rise in widespread technical knowledge, and with it a new aggressiveness in advocating how public land should be used. The trained expert may still command respect, "but not deference." Along with this heightened public interest, he said, was a rise in the sense of proprietorship among people with no direct legal claims to the land.

"If you propose to tear down a structure in a city that somebody else claims has historic value," he told the journal, "you learn something about what property rights are and aren't. A large number of people will try to prevent you from doing it, people who are exercising some interest in land which they don't own, have no thought of owning, which they don't even pay taxes on, and yet they think they have some rights concerning it."

When he directed BLM, the situation was very different. Few people besides ranchers "paid any attention to us." He could not remember a single lawsuit brought against the agency during the six years that he was director. Now, however, if BLM doesn't "have a new lawsuit filed against them every month, they think they're slipping."

If you go back one hundred years or more, there was the concept of absolute ownership, from the center of the earth to the zenith of the sky. . . . And sure, we were subject to laws of nuisance: If I did something on my land that impinged on you, you could sue me. But it was hard to bring suits and it was expensive. The chances of winning were not good, and settlements usually amounted to nothing or very little. It was about as near an unconstrained use of private land as one could imagine. And the pendulum has swung. . . . Now I

wouldn't say things have been perfect in their application... But nevertheless there has been a great rising trend of public control over private lands.

When *Resources* interviewed him six years later, Marion elaborated on what he called an "era of confrontation" between land users and federal agencies brought about in part by greatly increased distrust of government and more competition for land use. (Users seemed to be saying, "Whatever those SOBs in that agency say, it ain't so, and we'll oppose it.") Yet he saw the confrontation as something that the federal government itself could diffuse. And he remained firm in his belief that federal ownership of public land is here to stay. The idea of turning much of it over to the states was "utter nonsense." At the same time, however, he favored a second look at how federal lands are managed and urged the Forest Service, for example, to "define what ecosystem management means," so that it isn't just "more rhetoric" rather than "operating procedure."

He tended to sympathize with the notion of compensating private landowners when the federal government limits the use that they can make of their property for the public good. The whole field of property rights, he said, needs some re-examination. "The distinction between private lands that are under public control and public lands

that are used privately and subject to all kinds of influences—it is not as sharp as it once was. Now there is a continuum, not a sharp break."

In some ways of course, the more things change, the more they stay the same. Wildlife management is one example, as he pointed out. Striking a balance

nation's renewable resource situation is much better, he said, than it was in the early part of the century when he was growing up. We are providing for far higher levels of consumption. The "real revolutionaries of the last half century," he maintained, have been the agricultural scientists. "Our land is producing far more

per unit of area than it was ten years ago, thirty years ago, fifty years ago. . . . You know, Mr. Malthus is standing on his head over there in the corner." As for timberland, the acreage has not increased, in fact it has decreased slightly, and yet the volume of wood has increased greatly over the years. "We certainly have begun to grow timber in a much better way than we once did."

Meanwhile, he argued, the scars on the environment are not worse than they were at the turn of the century. "Of course, it's a *non sequitur* to jump from that and say everything is perfect, just wonderful, no criticism allowed." ☞

The Sagebrush Sage: Marion Clawson (1905-1998)

In RFF President Paul R. Portney's estimation, Marion Clawson did more than most of us could do in a millenium. "He was a phenomenally productive scholar, a fine civil servant, and a skilled research administrator."

Clawson authored some forty books, twenty-three of them for RFF. He served the departments of Agriculture and Interior for a combined twenty-three years. In shorter but nonetheless potent bursts of time and energy, he advised foreign countries such as Chile, India, Israel, Pakistan, and Venezuela on agricultural economic issues, working through the United Nations and the Rockefeller and Ford foundations. He taught at the University of California-Berkeley, the University of Washington, and Duke University.

He received his own education at the University of Nevada, where he earned undergraduate and graduate degrees in agriculture. Later he earned a Ph.D. in economics from Harvard.

He was, in the words of Senior Fellow Roger A. Sedjo, a "big man who had a big life" even before arriving at RFF, which he served in a number of executive capacities, including a term as acting president. He was senior fellow emeritus at the time of his death.

Clawson was also "big" as a person, Sedjo adds. "Marion was always positive and upbeat. He didn't have time for petty bickering. He often resolved disputes by simply outworking the opposition."

Speaking of work, at the age of ninety-two Clawson was still driving into his office at RFF once a week. He shrugged off his son's reminder that cabs were available to take him through the morning rush hour. "I know there are taxis," Clawson reportedly responded. "And when I need a taxi, I will take a taxi." Apparently, he never did.

between the National Park Service's mandates for recreation and preservation is a dilemma that is as old as the service itself.

Regardless of the inevitable differences of opinion on public land issues, Clawson urged us not to lose sight of the fact that "we have done pretty well" over time. The

Contributions to the Marion Clawson Memorial Fund c/o RFF will honor Clawson's memory and support research in his areas of professional interest.



Putting People in the Picture

Resources talks occasionally to RFF's researchers about their personal goals, outlooks, and expectations as they go about their work day to day. This profile features Molly K. Macauley, a senior fellow in the Energy and Natural Resources Division.

Senior Fellow Molly K. Macauley has helped to build the field of space economics. That's outer space—not real estate. The field is still so tiny that folks are apt to jump to the wrong conclusion, Macauley laughs. Thinking of outer space as a natural resource and applying economic principles to its allocation are still somewhat obscure notions. It took about five years before Macauley could attract any outside funding for her research at RFF. And it took the same period of time, she adds, to overcome the rap that, as an economist, she was rather alien herself, ready to reduce the thrill of space exploration to a lot of number crunching.

What kept her going, Macauley says, was the encouragement she received from her colleagues. Macauley was a new Ph.D. fresh out of Johns Hopkins University when she came to work for RFF in the mid-1980s. Senior staff had occasionally thought about outer space as a natural resource, but no one had pursued the idea until Macauley came along. As she took up the subject, she used to have long talks with Senior Fellow Allen Kneese, known for pioneering the field of environmental economics.

"Maybe he was just speak-

ing metaphorically," she recalls, "but I remember him saying that when he first advocated taking a market-like approach to understanding the environment he used to be blackballed in Congress and elsewhere because it seemed heretical to put a dollar value on the environment.

I've sometimes felt like I've gotten the same reaction to space economics, that people have found it heretical to talk dollars and cents about a quest that has these spiritual, emotional, and philosophical dimensions."

"Allen's counsel," she remembers "was always to go forward with the best economic analysis you could do. And that's what I've tried to do. Even when it hasn't been very popularly received."

Over time, attitudes have

changed. People have become more aware of the contribution that economics can make to space exploration and development. The National Space Society cited Macauley as a "rising star." Commercial activities in space have grown, too. No longer the exclusive

province of government, space is now filled with private-sector competitors in telecommunications as well as in newly privatized ventures such as remote sensing, where satellites take pictures of

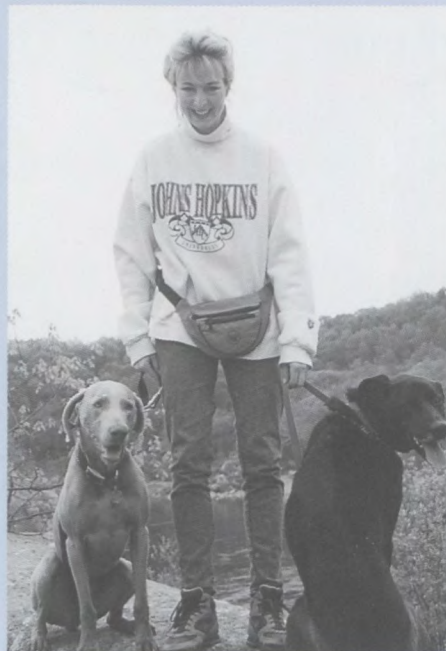
objects on Earth and send them back down for sale.

And nowadays Macauley gets a serious hearing on Capitol Hill. She is invited to testify fairly regularly on the pros and cons of legislation to foster space industry growth. Based on her recommenda-

tions, Congress has decided to give a voucher program for space transportation a try. The demonstration program operates on concepts that Macauley developed. The vouchers work much like the ones used for education, only in this case scientists pick and choose among a number of commercial alternatives to the government space shuttle to launch experiments that need to be done in outer space.

"Really all I've been doing," she says, "is applying RFF's traditional toolkit to space as a natural resource." It's a great time to be weighing in, she adds, since the regulation of space-related activities is still new. "We're able to apply some of the lessons learned from the regulation of environmental quality, for example, and try not to make the same mistakes."

Macauley's contribution to the development of outer space is a testament to the virtues of serendipity. Never a Trekkie or a science fiction buff, she says an internship at the Communications Satellite Corporation actually led to her interest in space. Once on the scene, however, it didn't take her long to find that COMSAT lawyers and engineers were grappling with issues that could be clarified by economic analysis.



Molly Macauley, Morgan, and Jeeves

One problem was how to allocate satellite locations in the geostationary orbit that girdles the Earth about 22,300 miles above the equator. Certain locations along the orbit were increasingly congested because they were prime real estate for communications satellites. Instead of using customary administrative procedures to match satellites with locations in ways that did not account for supply and demand, Macauley suggested the idea of applying some of the principles of urban economics, a field that RFF coincidentally had pioneered in the 1970s.

"To cope with the scarcity of land downtown you economize by building up, building skyscrapers," she explains. Likewise, there are only so many choice locations in the geostationary orbit. From certain locations you can see Europe and the United States and interconnect the two for telecommunications purposes. Other locations are out over the ocean and thus a sort of boondocks.

"Many nations were clamoring for access to 'downtown,' if you will. So I thought if downtown were properly priced per acre you'd have capital-intensive satellites, economizing on the orbit just like skyscrapers economize on land. And in the so-called boondocks you could have a very simple satellite, operating with just the basic technology."

The idea became the basis of Macauley's dissertation. Once she arrived at RFF, she

was able to refine some of her analysis by drawing further on her new colleagues' work. The cross-fertilization cuts both ways, since some of her colleagues at RFF have joined Macauley to put the principles of environmental economics to work in outer space.

Right now, for example, she and Fellow David Austin are helping NASA's Jet Propulsion Laboratory develop a set of measures to assess the efficiency and cost-effectiveness of some of their technology-transfer efforts. With Senior Fellow Tim Brennan, she is studying the economic value and use of information about Earth's environment and climate; this information is gleaned from space-based satellites taking photos and other measurements of Earth processes.

So what is on Macauley's wish list? If she could determine the future of space exploration and commercial activity, what would she like to see? NASA's mission should be streamlined, she says, to focus more exclusively on R&D, the study of the planets, and space science. "What is the origin of the universe? That sort of question."

Right now, the space agency's authorization mission may be too broad, she thinks. "Unfairly so, because it has too many constituencies to which to answer." Although there is money to be made in space, she would like to leave the opportunities for commercial activity to the private sector.



THE GALLERY STUDIOS

The greening of America's profits

Can companies profit from operating clean and green? And do their environmental records have any bearing on how they are valued in the stock market? These were among the questions that some sixty corporate managers, investment advisors, environmentalists, and researchers considered when the RFF Council held its eighth annual meeting in Florida this past spring.

Pictured here are Council member Bob Woodall and guest Jim Hendricks of Duke Energy who chatted during a break in the sessions presented under the umbrella topic "Corporate Environmental Performance and the Bottom Line."


Instead, NASA should visit comets, asteroids, and planets, which raises another controversy about whether robots or people should go. "Some say you need to keep people involved in the space program to maintain support. There's a saying to that effect: 'no bucks without Buck Rogers.'" Both sides have their merit, she says. What's important is that the exploration take place.

The very boom in space activity has its worrisome implications for the future, however. Will the thrill we felt when a man first walked on the moon soon be gone, Macauley wonders. The realization that we now use a satellite

to make a phone call has already faded into the background. Will young people support a space program when virtual reality games can make them feel like they've already been there and done that?

There's no way to tell, but a NASA mission that focuses on good, high-quality science might help lead us back to the origins of our quest, Macauley believes.

One more wish: She would love to fly on the space shuttle.

 For more information about Macauley's current research projects and her recent research outputs and publications, go to http://www.rff.org/about_rff/web_bios/macaulay.htm.



ANNOUNCEMENTS

1998 award winners

Gilbert F. White Postdoctoral Program

Sarah Michaels and Thomas Sterner are the recipients of this year's fellowships, named in honor of the retired RFF board chairman.

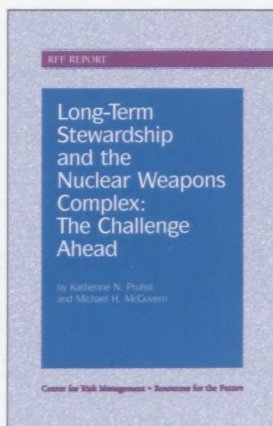
Michaels is a geographer and assistant professor in the Department of Urban and Environmental Policy at Tufts University. At RFF she will study public participation in policymaking involving watersheds in Massachusetts.

Sterner is a professor of environmental economics at the University of Gotheburg, Sweden. At RFF he will work on energy issues related to climate change.

Joseph L. Fisher Dissertation Awards

In honor of the late president of RFF, the Fisher awards are presented annually to graduate students in economics and policy studies during the final year of their doctoral research. Each of the following individuals received \$12,000 to support completion of the dissertation indicated:

- **Nancy Bergeron**, Department of Agricultural, Resource and Environmental Economics, University of Maryland: "Wanted Dead or Alive: An Economic Analysis of the Black Market for Endangered Species."
- **Lilliana Botcheva**, Department of Government, Harvard University: "Regional Integration and Domestic Politics: The Influence of the EU on the Environmental Policies of East European Countries."
- **Stephen Holland**, Department of Economics, University of Michigan: "Set-Up Costs and Capacity Constraints in the Theory of Natural Resource Extraction."
- **Andrew Miller**, Department of Economics, Cornell University: Four essays on environmental externalities.
- **Michael Taylor**, Environmental Policy, Ohio State University: "Point-Nonpoint Permit Trading Mechanisms to Reduce Costs and Increase Efficiency in Water Pollution Control."



June 1998
ISBN 0-915707-97-7
80 pages
\$9.95 paperback

The report may also be downloaded at
<http://www.rff.org/reports/summaries/stewardship.htm>.

Long-Term Stewardship and the Nuclear Weapons Complex: The Challenge Ahead

By Katherine N. Probst and Michael H. McGovern

Decades of U.S. nuclear weapons production have left a legacy of hazardous and radioactive waste and contaminated facilities, soil, and groundwater. The Department of Energy estimates that its cleanup of weapons production sites will cost over \$150 billion. Yet even after that money is spent, these sites will need long-term attention to protect human health and the environment.

In their new report, Probst and McGovern make a compelling case for a formal program of long-term stewardship for contaminated sites. Stewardship refers to "institutions, information, and strategies needed to ensure protection of people and the environment, both in the short and the long term," after DOE finishes its work. Stewardship planning must start now.

The authors detail the requirements of a successful stewardship program and discuss its daunting challenges. They articulate issues still to be confronted, concluding with suggested next steps.

Katherine N. Probst is a senior fellow in RFF's Center for Risk Management. Michael H. McGovern, formerly a CRM researcher, is a senior analyst at the Center for Verification Research.

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Discussion papers may be ordered through RFF. The price per paper covers production and postage costs and is based on delivery preference: domestic, \$6 for book rate and \$10 for first class; international, US\$8 for surface and US\$15 for air mail. Canadian and overseas payments must be in U.S. dollars payable through a U.S. bank.

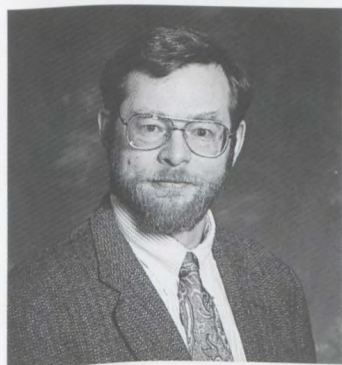
Please send a written request and a check payable to Resources for the Future to: Discussion Papers, External Affairs, Resources for the Future, 1616 P Street, NW, Washington, DC 20036-1400. Recent discussion papers are accessible electronically at <http://www.rff.org>



Corporate outlook on RFF

The RFF Board of Directors created the RFF Council in 1991 to recognize associations, corporations, private foundations, and individuals with an interest in natural resource and environmental policy and a concern for RFF's financial well-being. Council membership is offered to representatives from organizations that contribute a minimum of \$25,000 annually and to individuals who contribute at least \$2,500 annually.

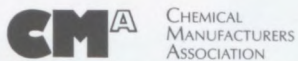
Each spring the Council meets to discuss a public policy issue in conjunction with the semiannual meeting of the board. Shortly after the Council met this spring, several corporate members took a few minutes to describe why they and their companies choose to maintain strong ties with RFF. In subsequent issues of *Resources*, we'll present comments from some of the private foundations and individuals who so generously support our research, analysis, and outreach efforts.



Much of the controversy surrounding environmental issues arises from the difficulty of identifying and quantifying the costs and benefits of alternative policy choices. RFF's expertise in this area is unique ... to help support ... public policies that are both environmentally and economically efficient. From AT&T's perspective, which is based on industrial ecology principles, such inputs to the policy process are critical to achieving rational ... approaches to environmental issues. ... Both society and AT&T benefit from our relationship with RFF.—**Braden R. Allenby, Vice President, Environment, Health & Safety, AT&T**



CMA has had a long and constructive relationship with RFF—as a participant in projects and dialogues and as beneficiaries of both policy and economic research. While we haven't always agreed with the findings, we have always felt that the process was transparent and that no agenda was being pursued. RFF makes a real contribution to the state of knowledge and understanding in the natural resources policy arena.—**Mort L. Mullins, Vice President, Regulatory Affairs, Chemical Manufacturers Association**



Merck has been a member of the RFF Council since 1991. I value RFF quite simply because it helps me do my job. Through the council meetings and other fora, RFF gives me the opportunity to get input on issues from a wide variety of viewpoints including industry, regulators, government, NGOs, and others. RFF gives me the ability to know what other people are thinking and in which direction policy is going. That knowledge is the single most important reason we support RFF. RFF's independence and ability to convene disparate interests: that's the benefit to Merck.—**Dorothy P. Bowers, Vice President, Environmental & Safety Policy, Merck & Company, Inc.**



RFF research is always timely and relevant. It is amazing how the annual RFF Council meeting always addresses an issue on which Southern Company is working simultaneously. Urban air quality, climate change, and corporate environmental reporting are a few examples. Possibly the most beneficial aspect of our relationship with RFF is the ability to visit with RFF fellows and pick their brains on tough natural resource issues. I find these discussions to be invaluable.—**W. R. Woodall, Vice President, Environmental Policy, The Southern Company**



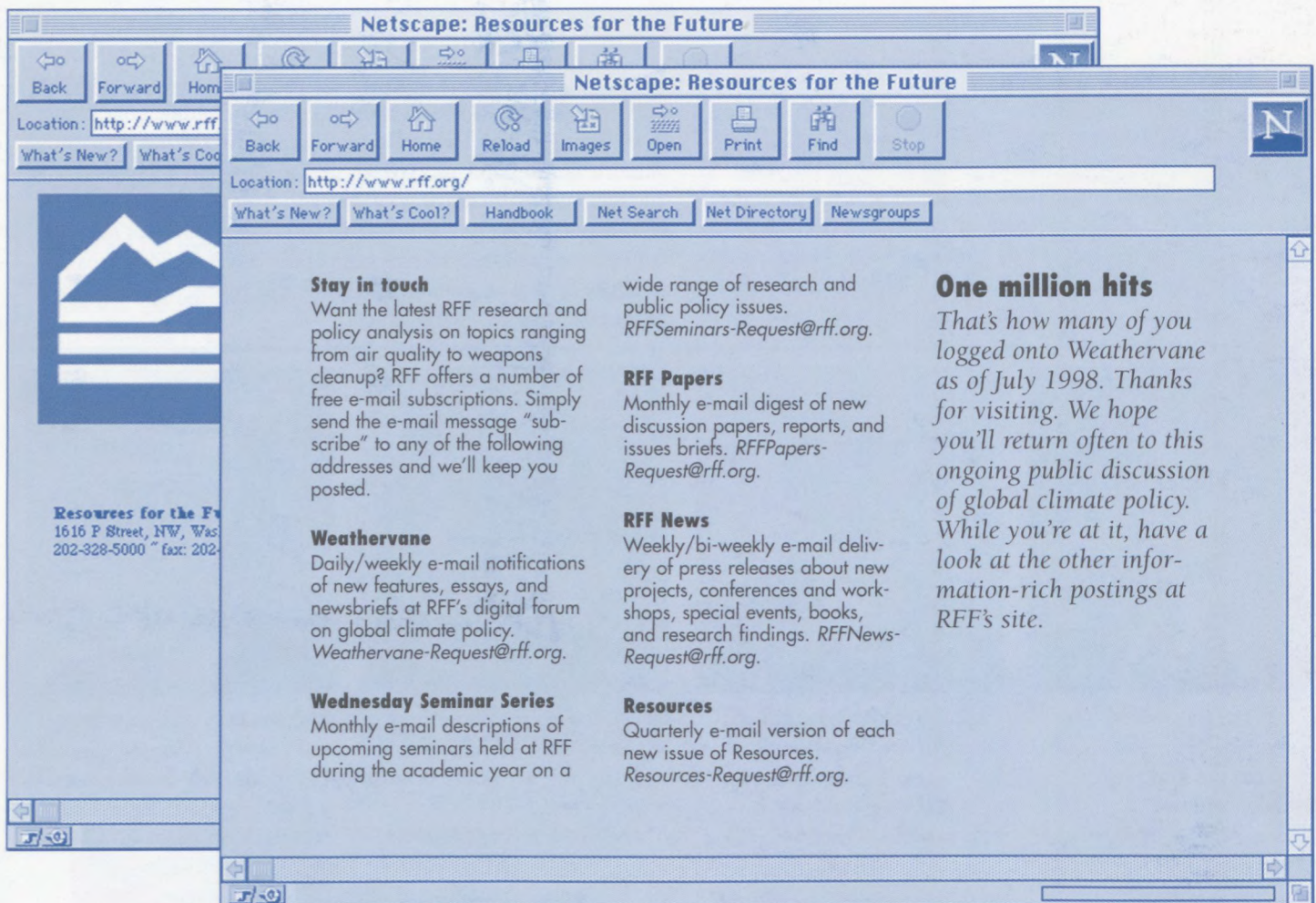
To learn more about RFF's Corporate Associates Program contact Matthew Logan, Assistant Director of Development, at 202-328-5154; logan@rff.org.



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