

RESOURCES

Green Politics and Policy

WELCOME

Research to the Service of Public Policy



PHILIP R. SHARP
PRESIDENT

Using careful scholarship to inform policy choices is at the core of what we do at RFF. This issue of *Resources* offers several excellent illustrations of how we bring serious research and ideas to the service of public policy.

As I write this, the United States is in the midst of a campaign to choose a new president. Energy and environmental issues loom large, and RFF University Fellow Jon Krosnick provides some valuable context for understanding this phenomenon and its implications for the policy landscape. Much of his extensive research of American public opinion has been conducted with RFF's Ray Kopp

Visiting Scholar Nigel Purvis takes on the difficult question of the linkage between domestic climate action and securing international agreements, proposing a novel way out of an issue that has emerged as a major impediment to U.S. international climate negotiators. A full institutional analysis underpinning this proposal can be accessed at www.rff.org/tradingapproachesonclimate.

RFF Senior Fellow Carolyn Fischer and University Fellow Richard Newell share the results of their examination of a suite of currently proposed policies to promote technological innovation of alternatives to fossil fuels. Their results provide an important insight for policymakers looking to expand green power—don't underestimate the effectiveness of an emissions price.

The strength of all of these contributions stems from their roots in serious research, something that continues to be at the heart of RFF. As our scholars are called on more and more for advice by the policy community, it is important to emphasize our continued commitment to serious academic research. In the past few months, our scholars have published in top-tier academic journals like the *American Economic Review*, *Science*, the *Proceedings of the National Academies of Science*, and the *Review of Economics and Statistics*.

To facilitate and support this kind scholarship and policy input, we have added two important players to RFF's senior leadership team: Mark Cohen, our new vice president for research, and Lea Harvey, our new vice president for development. They are already proving to be very valuable assets, bringing us fresh energy and thinking, coupled with an appreciation for the ideals that have guided this institution for over 50 years.

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Promoting Green Power ▶ www.rff.org/promotinggreenpower

Trading Approaches on Climate ▶ www.rff.org/tradingapproachesonclimate

Green Politics and Polling ▶ www.rff.org/greenpoliticsandpolling

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Sandra A. Hoffman, an RFF fellow, focuses her research on the role of economics in regulatory risk analysis. She works on a number of policy issues, including food safety, valuation of children's benefits from environmental policy, modeling the social costs of pesticide use, and the health benefits of environmental policy in China.



RAYMOND J. KOPP



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An associate professor of environmental science and policy at the University of California, Davis, and an RFF University Fellow, **James N. Sanchirico** analyzes policy questions at the interface of ecology and economics. He focuses primarily on the economic analysis of marine policies, especially the effects of individual transferable quotas and marine protected areas.

BIOGRAPHY LINKS

If you are reading this online, selecting an RFF scholar's name above will open a new window in your web browser, displaying their detailed profile and credentials. To learn more about RFF in general, visit our website, www.rff.org.

Making a Mark on Policy

During his freshman year in college, Mark Cohen was aiming at a career in foreign affairs when he bumped into William Proxmire, the legendary and feisty Wisconsin senator, who took him on as an intern. The experience quickly turned Cohen into a classic Hill rat, infatuated with the ways that ideas could influence domestic policy formation.

Cohen, recently named vice president for research at RFF, found himself drawn toward work that combined the rigor and rationality of economics with the practical demands of effective governance.

"I am unapologetically a policy maven," says Cohen, who previously was a professor at Vanderbilt University's Owen Graduate School of Management and co-founder of the Vanderbilt Center for Environmental Management Studies. "Academic findings are invaluable, but they need to be injected purposefully into the policy process."

At RFF, Cohen will assume a newly created position that will oversee all research programs and guide efforts to align RFF's mission with current environmental, energy, and natural resource policy issues. He also will serve on the RFF management committee.

"Mark emerged as the top candidate after a lengthy search to fill an important new leadership position," said RFF President Phil Sharp in announcing the appointment. "He has a demonstrated ability to affect institutional change in an academic setting and to nurture program development. Moreover, he has a strategic mindset that recognizes the vital role of individual, entrepreneurial scholars in policy-oriented research."

Cohen was at Vanderbilt in various positions since 1986, including departmental chair and senior associate dean of the Owen School. He also held a secondary appointment as professor of law at Vanderbilt. He recently taught graduate-level courses for business and law students on "Corporate Strategies for Environmental and Social Responsibility" and "The Law and Business of Climate Change."

After graduating from Georgetown University in 1978, Cohen worked for two years as a staff economist at the Environmental Protec-



tion Agency. "As a young staff analyst, I was surprised to learn that enforcement issues were largely an afterthought when developing environmental regulations. It became clear to me that if regulations were to be effective, enforcement issues needed to be studied with rigorous economic and policy analysis just like the regulatory policies themselves," he says. "So, I decided to focus on applying economic tools to environmental enforcement when I went back to school to go for a doctorate in economics. I not only enjoyed the rational approach that economics offers, but the academic world provided a lot of stimulating challenges." In 1985, he received his Ph.D. from Carnegie Mellon University's Graduate School of Industrial Administration.

Cohen returned to Washington to work at the Federal Trade Commission, and then began what he jokingly terms a "life of crime." He moved to the U.S. Sentencing Commission and helped bring economic and benefit-cost analysis to criminal justice policy. Over his career, in addition to his work on environmental monitoring and enforcement, he has published dozens of papers and articles on crime-related topics, including corrections policy, corporate

malfeasance, and willingness to pay for crime control programs. Some of that work even focused on environmental crimes—meshing his background in environmental enforcement and crime policy.

In addition to focusing on environmental enforcement policy, he has published on a wide variety of topics including the role of environmental regulation on innovation, and the effect of mandatory disclosure programs on firm behavior. He also is a recognized authority on sustainability reporting guidelines, which

are standardized measures used by organizations to communicate their economic, environmental, and social performance and to measure their impact on sustainable development. He currently is on the management committee of

the Stakeholder Council of the Global Reporting Initiative. This international organization provides guidance for corporations and nonprofits to use in disclosing their sustainability performance, and also provides stakeholders a universally applicable, comparable framework in which to understand disclosed information.

Over the years, Cohen has maintained a close association with several RFF researchers, including former RFF President Paul Portney and Senior Fellow Jim Boyd, and he often cites the work of Senior Fellows Winston Harrington, Alan Krupnick, and Karen Palmer, among others. He holds a deep respect for RFF's policy work.

In accepting the new position, Cohen said, "I believe that transparency, communication, and inclusiveness are key ingredients to managing an engaged research team. I look forward to using my experience as a researcher, academic entrepreneur, and administrator to expand RFF's exemplary reputation and to gain broader international recognition."

Cohen and his wife Robin have one daughter, who is a senior at the University of Pennsylvania's Wharton School. Among his outside interests, he is an avid art collector and a practitioner of yoga. ■

Dedicated to Nature—and Nonprofits



A love of the outdoors and a personal commitment to conserva-

tion of natural resources led Lea Harvey to a career in nonprofit management—with a particular bent toward environmental policy.

Recently named vice president of development at RFF, Harvey brings to that role years of experience as a fundraising executive for leading environmental and nonprofit governing organizations.

RFF President Phil Sharp noted that Harvey's proven abilities in solicitation and stewardship of financial resources for nonprofit groups were exemplary qualifications for her new position. "Lea affords us a demonstrated enthusiasm for nonprofit development and a solid background in environmental issues," said Sharp. "She understands our mission and will add significant value to our management team and to our fundraising operation."

Growing up in a small town in coastal South Carolina, Harvey spent much of her time outdoors and, in her words, "was enthralled with the natural world." She continues to set aside time for bicycling, hiking in the mountains, canoeing in wilderness areas, and finding the best fly-fishing spots.

After graduating from Sweet Briar College in Virginia with a degree in art history and minor in nonprofit management, Harvey came to Washington assuming she would explore work in museums. "I soon learned that my heart was in organizations that made a positive difference in the quality of people's lives," she says. "Before long, I was ensconced in the world of nonprofits and the environment."

From 1998 to 2005, she worked in several key positions at the World Wildlife Fund, an

international conservation organization. As director of foundation and corporate relations, she led a staff of six to build a \$14.5 million foundation and corporate fundraising program. She also focused on building partnerships with foundation and corporate grantmakers to advance conservation and sustainability initiatives in the United States, Africa, Asia, and Latin America.

Most recently, until she joined RFF, Harvey was vice president of development at BoardSource, a Washington-based publishing and consulting organization dedicated to strengthening nonprofits of all sizes and mission types by strengthening the boards that lead them.

"Our mandate was to help nonprofit boards of directors and chief executives to become the most strategic and effective leaders they could be," she says. "That involves an intense focus on mission, candid evaluation of successes and failures, and strategic planning that pays off in better results. It gave me invaluable insights into how good nonprofits work, and how others may falter."

Kathryn Fuller, a member of the RFF Board and former president and CEO of the World Wildlife Fund, noted that Harvey's skills in nonprofit management and development would be major assets in her new position. "Lea has a wonderful personal style and a keen intelligence, and she attracts genuine respect from her colleagues," says Fuller. "And to be sure, she's a producer of good results." ■

Meeting Future Energy Needs in the Context of Global Climate Change

Raymond J. Kopp

In June, Senior Fellow Ray Kopp, director of RFF's Climate Policy Program, testified before the Senate Energy and Natural Resources Committee on meeting increased global energy demands in the context of addressing global climate change. This article is based on his full testimony.

In order to meet a carbon dioxide (CO₂) concentration target of 450 parts per million, the widely agreed-upon number for stabilizing the rate of global climate change, sobering economic challenges lie ahead in terms of the investments needed for research, development, and demonstration (RD&D) and physical capital but the technology path itself is feasible.

A good deal of our collective understanding of the challenges posed by climate change is reflected in the recent International Energy Agency's (IEA) report, *Energy Technology Perspectives 2008: Scenarios and Strategies to 2050*. (Kopp was asked to summarize the report's findings.) Most importantly, there is no silver bullet. In addition to conservation, virtually all commercially available low-carbon technologies and those that will become available over the next few decades must be deployed.

Two things will have to happen if substantive progress is to be made. Carbon pricing will be crucial to providing sufficient incentives for both conservation and technology development and deployment. And governments will be required to greatly enhance spending on RD&D and to ensure the efficiency and efficacy of that spending. But the biggest hurdle is likely to be building up sufficient momentum—time is not on our side, for two key reasons.

Global demand for energy continues to rise, and the bulk of that increase will come from non-OECD (Organisation for Economic Co-operation and Development) countries. Correspondingly, the necessary investments in energy-producing and -consuming technologies must take place there as well, although new low- and no-carbon energy sources (such as nuclear and renewables) will be more costly than conventional sources. In OECD countries, we may be willing to bear higher carbon prices but non-OECD countries are already hard-pressed to afford current fossil fuel technology, much less subsidize low- and no-carbon energy sources.

Investing in RD&D, conservation, and physical, energy-related capital must begin immediately. Any delay means greater atmospheric concentrations in the coming years. Unfortunately, we cannot wave a magic wand and will this process to commence. Rather, we must follow a slow and arduous path to develop and implement the many public policies, domestic and international, that will remove barriers and enable investment.

We must buy some badly needed time and, fortunately, we have a very good option, namely the 15 to 20 percent of global CO₂ emissions that come from deforestation in tropical countries. While it is now widely known that China and the United States are the two largest CO₂ emitters, the next two are Brazil and Indonesia, due to widespread deforestation.

Reducing CO₂ emissions by reducing deforestation can be accomplished with targeted domestic policies that alter the economics of land use to make a standing forest more valuable than alternative uses of the land. Using the growing international carbon market and the nascent U.S. market to monetize the carbon contained in standing forests will provide the economic incentives needed to alter land-use decisions.

In principle, such land-use decisions could be changed very quickly, giving rise to rapid reductions in CO₂ emissions. These large-scale reductions in forest-related CO₂ are sure to become ever more valuable in light of the hard work ahead to achieve the needed fossil-based reductions in the decades ahead. ■

An Overview of the Economic Benefits of Cooperatives and Individual Fishing Quota Systems

James N. Sanchirico

In July, RFF University Fellow James Sanchirico testified before the U.S. Senate Committee on Commerce, Science, and Transportation Subcommittee for Oceans, Atmosphere, Fisheries, and Coast Guard. This article is based on his full testimony, which is available on our website.

The marine species residing in U.S. territorial waters and the men and women who make their livelihood from them are at a critical juncture. Without secure access to the resource, individual "fishers" compete with each other to capture as much of it as possible.

Cooperating under so-called rule of capture incentives, whereby the catch is not owned until onboard a vessel, results in a competition for fish that leads to low wages, dangerous

working conditions, low-valued products, excess harvesting and fish processing capacity, and ever-shorter fishing seasons. Economically depressed fisheries are vulnerable to short-term thinking and risk-taking, and fishery participants cannot afford to invest in long-term sustainability.

This outcome is in nobody's best interest. In other words, it's a classic tragedy of the commons.

These conditions are not fated, however. Policies that address the rule of capture incentives include fishing cooperatives and individual fishing quota systems (IFQs). In each policy, the allocation of catch shares reduces the incentives to invest in the "race for fish." Participants have a greater certainty about their catch levels and the ability to buy and sell shares provides flexibility for



participants to adjust the scale of their operations.

Around the world, fisheries managed with IFQs or cooperatives experience sustainable profit rates that range from 20 to 60 percent. These overall economic benefits are indicative of both cost savings and revenue increases. They derive from ownership of the catch shares and the ability to transfer the shares from one fishing participant to another.

Benefits from ownership include the reduced incentive to race for fish, which results in longer fishing seasons and a slower pace of fishing. The slowed pace improves the ability of vessels to optimize on-board processing facilities, resulting in increases in the amount of product sold on the market per pound of fish caught. Essentially, the incentives shift from maximizing the quantity of fish caught to maximizing the value of the catch.

Additional benefits can be gained from the transferability of the catch shares. Typically, fisheries managed under an IFQ system see a reduced number of vessels as excess capacity is removed from the fishery, and participants utilize the additional flexibility to determine the optimal scale of their operations. Higher-cost (and thus less-efficient) vessels will find it more profitable to sell or trade their shares than to fish them, and so the total allowable catch will be caught at the lowest possible cost.

One of the most powerful forces of change created by catch-share programs is a constituency whose wealth is a function of the health of the marine environment. Wealth creation, in turn, can lead to improved stewardship, sustainability, and further innovation to increase value. ■

Taking a Closer Look at the Cost of Air and Water Pollution in China

Sandra A. Hoffmann

In recent months, the press has been filled with stories of the extraordinary efforts the Chinese government made to assure that environmental conditions met world approval during the 2008 Olympics. Earlier this summer, the city of Qingdao mobilized thousands of people to clean up an algal bloom that choked the coastline and threatened Olympic sailing competitions. In Beijing and neighboring cities, factories were closed to a surrounding distance of 300 kilometers. In Beijing itself, government vehicle traffic was cut by 70 per-

cent and private vehicles were already put under an alternate driving-day restriction, two moves that were expected to reduce 40 percent of the 3.3 million vehicles on its streets. Such unparalleled actions paid off—at least temporarily: the air over Beijing cleared a few days before the Olympic opening day.

But, of course, the real impact of pollution in China has less to do with the Olympics than with the sustained exposure that the Chinese population faces. China's remarkable economic growth over the past 25 years, spurred by massive industrialization, has had severe environmental consequences. Fine particulate levels (PM 10) in major Chinese cities are roughly twice World Health Organization guidelines and three to four times those typically seen in U.S. or European cities. In meeting rising energy demands, China has become the world's largest emitter of sulfur dioxide. Water supply and quality, which are strongly affected by both industrial pollution and bio-

logical waste, have been a focus of public concern in the past few years.

China has made strides toward implementation of more effective environmental quality management. Significant progress was made during the 1980s and 1990s, but those advances have slowed in the past decade. For example, energy efficiency—which increased markedly from 7.5 tons of coal per 10,000

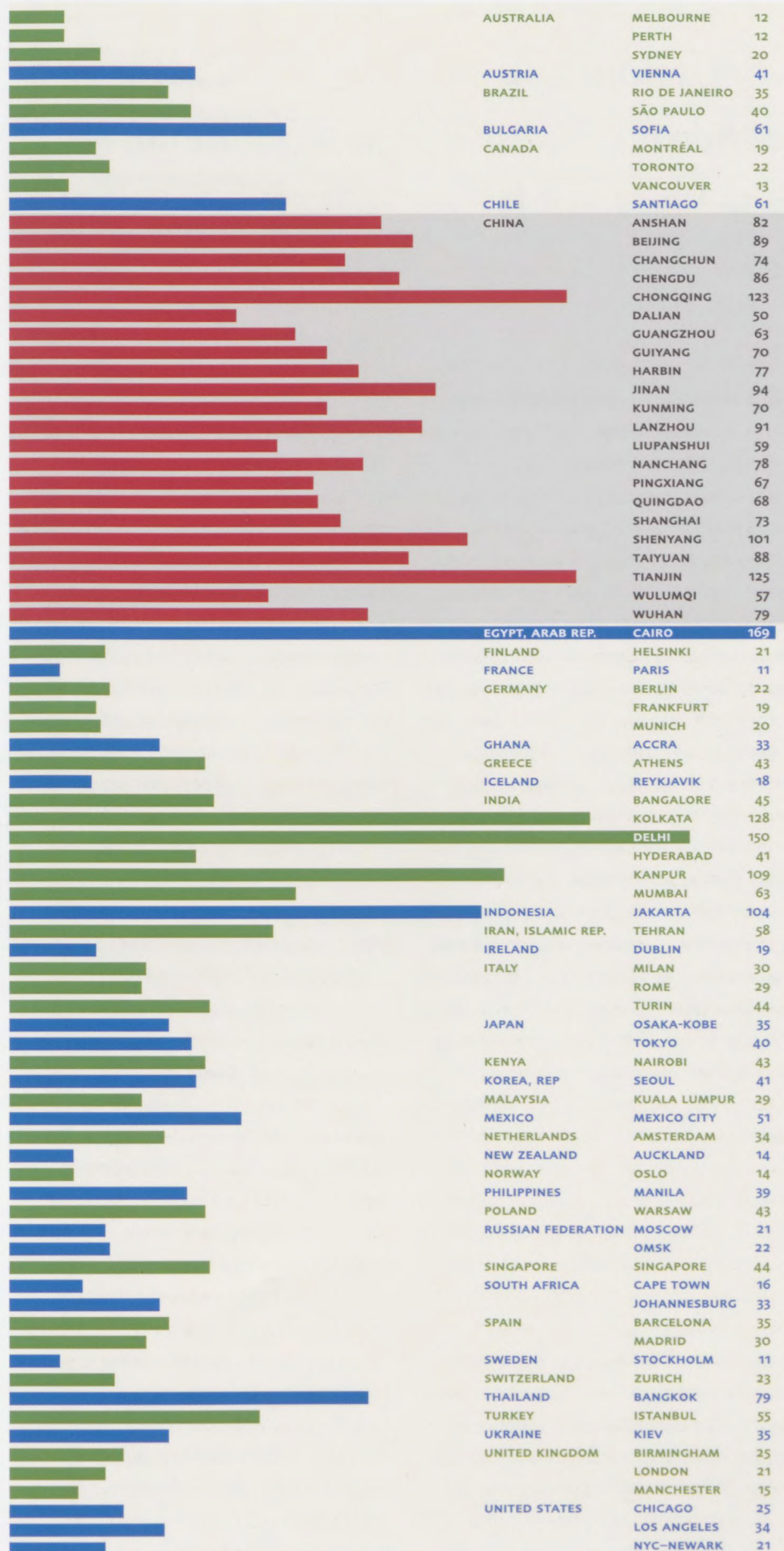
yuan of GDP in the 1980s to roughly 2.5 tons in the late 1990s—has stagnated since then. Likewise, urban air quality improved in the 1980s and 1990s but has

污染

stalled in the past decade, due in no small part to the rise in car ownership, up 31 percent between 1990 and 2003.

Despite this gloomy recent performance, China is in a good position to move more aggressively to address these environmental quality problems. Rapid industrialization has provided the financial resources to take advantage not only of modern pollution control technologies but also decades of experience throughout the world with designing more effective pollution control policies. The challenge ahead is finding means of efficiently controlling pollution without unduly slowing the economic growth that lifted an estimated 400 million people above the extreme poverty line between 1980 and 2000.

Efficient pollution policy requires information. RFF Senior Fellow Alan Krupnick and I are working with a team of scientists and economists from the World Bank, Norway, and China to model the health and productivity



Left: Average annual PM10 concentrations observed in selected cities worldwide, 2004–05. Despite higher counts found in larger capitals, China's cities lead the world in overall levels of pollutants.

Source: World Bank Indicators, 2005

impacts of air and water pollution in China. The model is national in scope and regional in detail. It both provides a baseline picture of pollution impacts and builds China's capacity to assess the effectiveness of pollution control efforts. By combining Chinese ambient monitoring data with international and locally estimated dose-response functions, the model makes it possible for China to evaluate changes in the impacts of pollution on human health, agriculture, fisheries, and physical infrastructure over time. By valuing impacts in monetary terms, it also provides a means of comparing otherwise incommensurable alternatives.

As part of this project, we conducted some of the first surveys in China estimating people's willingness to pay for reductions in their risks of death associated with air pollution. This international collaboration marks a significant step toward developing a green accounting system and the essential information infrastructure for efficient pollution control in China. ■

U.S. Greenhouse Gas Emissions Reductions: What are the Opportunities, At What Price, and Through What Policies?

The same day that the U.S. Senate embarked on what RFF President Phil Sharp referred to as "a heavy-duty debate" on the Lieberman-Warner bill, a capacity crowd gathered at RFF to listen to a related debate sparked by the recently released McKinsey & Company report, *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?*.

At a time when scientists are calling for dramatic reductions in emissions, government forecasts predict a 35 percent increase by 2030 if the current trend prevails. And if, according to Sharp, addressing climate change is "the issue that is front and center in this country and around the world," then the pivotal sequela in the United States is the cost of reducing greenhouse gas (GHG) emissions and how to design policies to achieve reductions at the lowest possible cost.

Senior Fellow and RFF's Director of Energy and Natural Resources Billy Pizer moderated the June 4 event that examined how the McKinsey report arrived at its conclusions to those questions. Joining him were McKinsey & Company Director Ken Ostrowski; Congressional Budget Office's Senior Advisor for Climate Policy Terry Dinan; and RFF University Fellow Richard Newell, a professor at Duke University's Nicholas School of the Environment and Earth Sciences.

The McKinsey report joins a long series of reports that assess individual opportunities for energy efficiency and combine them in a bottom-up approach to determine the overall price of such reductions. However, this approach—so different from the traditional one spawned by microeconomic theory that looks

at market responsiveness to higher energy prices to derive a top-down price for reductions—has drawn criticisms and concerns from the economic community, some of which surfaced at the RFF event.

Most of the event centered on a single graph in the McKinsey report that separates various GHG reduction opportunities into negative and positive abatement, with an outlay less than \$50/ton, for a total reduction of up to 4.5 gigatons. Negative abatement comes from energy efficiency opportunities that save more than they cost, such as residential lighting, where the long-term savings from more expensive energy-efficient bulbs outweigh the lower price of regular bulbs.

Essentially, if all of the McKinsey report's projected energy efficiencies were captured, they would offset about 80 percent of the incremental growth in the demand for electricity by 2030. In dollars, the projected capital outlay in the McKinsey report totaled \$1.4 trillion over 25 years, set against roughly \$1 trillion of capital investment.

So why aren't the economists and policymakers breathing at least a small sigh of relief? Well, according to Dinan, negative abatement measures aren't new and have spurred a long-standing debate over why they haven't been used. At least part of the problem has been consistently low energy prices in previous decades, diluting the motivation to seek out low-cost alternatives. But the lack of action doesn't necessarily indicate a market failure or the need for a standard or subsidy, and Dinan cautioned that identifying true market failures is a prerequisite to determining the need for a

supplemental price policy. However, she noted, the numerous technology options in the report "really underlines the need for an economy-wide, uniform policy such as a cap-and-trade program or a tax."

But before a policy is created, Newell urged that models and analyses of specific policies be used to assess the overall costs of GHG mitigation. Each model has multiple possible scenarios, and each of those can translate into dramatically different costs: from less than \$50 in the McKinsey report to more than \$80 according to the Energy Information Agency analysis of Lieberman-Warner, almost doubling the projected expense of emissions abatement.

Many experts expect both the marginal and total costs of substantial reductions to be positive and significant rather than zero, making climate policy expenditures highly uncertain and raising the value of measures containing costs and allowance prices. In addition, while the debates will inevitably continue, it may well be impossible to know the total cost.

"The wide range of opinions about the expense of any given reduction really highlights the need for a price ceiling and a price floor," Dinan concluded. "In a sense, it's kind of an academic debate whether or not for \$50 a ton you're going to get a lot of reductions or a minor amount of reductions. You set the price and then you see how far you go."

Newell may have summed it up best when he said the danger in a study like McKinsey's is the message that "we can do climate policy at zero cost. That's the one-line message, and that one-line message is incorrect." And, since we're not going to be able to monitor total cost, "we should figure out what we're willing to pay incrementally and, if we get a lot free from energy efficiency... then we should go beyond that because protecting the climate is valuable."

With the Senate unable to resolve anything in their debate on June 4, and failing to pass Lieberman-Warner on June 6, formulating and approving a climate policy is at a temporary standstill, leaving a very clear need to keep the conversation going elsewhere. ■

► www.rff.org/rff/Events/US-GHG-Reduction-Price-and-Policies.cfm

How Should We Tackle the Forest Fire Problem?

Arun Malik

We're all familiar with the environmental and social costs of forest fires; in summertime—fire season in California—there are regular news stories about people losing their homes and thousands of acres ablaze. But the economic costs, literally who pays to put the fires out and how to contain them, are complex issues.

Severe forest fires have increased in frequency over the past decade, resulting in substantial losses of property and human lives. Last year brought one of the worst wildfire seasons in recent history; insured losses from wildfires in California alone were estimated to be over \$2 billion. Though the number of wildfires has gone down since the 1960s, the number of acres burned has risen markedly in the current decade. More than seven million acres of wildlands have burned in all but two of the last eight years.

The increased severity of fires, combined with continuing development in and near forests, puts many more communities at risk and has substantially increased both the difficulty and cost of fire suppression. Expenditures on fire suppression by the U.S. Forest Service alone have exceeded \$1 billion in five of the last seven years. And in 2009, nearly \$2 billion (48 percent of the agency's budget) is to be targeted at fire management, up from \$300 million (13 percent) in 1991.

A principal reason why the cost of fire suppression and the total number of acres affected have gone up stems from tradition. Federal agencies, including the Forest Service and National Park Service, have long pursued a policy of aggressive fire suppression; perversely, their

success has contributed to the increased severity of fires in recent years. Fire suppression has led to denser forests with more flammable materials, or "fuel loadings," and has altered the structure and composition of forests, rendering many more susceptible to fire. By the late 1960s, there was a growing realization that some fires could be beneficial. A small-scale program of "prescribed burning"—intentionally burning portions of a forest—was initiated in the late 1960s to reduce fuel loadings and to maintain forest structure and composition. However, fire suppression continued to dominate Forest Service policy for the next three decades.

By the mid-1990s, the essential role of fires became well recognized in policy circles. The 2001 federal wildland fire-management policy deemed fire to be a critical natural process that should be integrated into land and resource management plans. The 2001 National Fire Plan authorized a large-scale, long-term effort to reduce fuel loadings, with annual funding of roughly half a billion dollars.

In addition to prescribed burning, reductions in fuel loadings can be accomplished through mechanical thinning, which entails physical removal of flammable material through activities such as selective logging and clearing of underbrush. This year, the Forest Service also adopted the concept of "risk-based fire suppression," which calls for prioritizing fire suppression based on the infrastructure, property, and human values at risk. In addition, the Forest Service has expanded its policy of "wildland fire use"—which allows some naturally ignited fires to go unchecked if they do not pose threats to human welfare that cannot be readily mitigated.

While these policy reforms are generally considered to be in the right direction, they have nonetheless been subject to considerable criticism. Analysts have argued that current fuel reduction programs have a short-term focus and place undue emphasis on the number of acres treated, with limited attention given to treatment effectiveness. Also, more attention needs to be given to which forests are best treated as well as the types of fuels to be removed and the manner in which this should be done.

Fuel reduction is expensive, with costs running between \$500 and \$1,500 per acre for mechanical thinning, and \$50 to \$500 per acre for prescribed burning. Estimates of the costs of undertaking fuel reduction on high- and moderate-risk forest lands far exceed the sums budgeted for this purpose, especially when you consider that fuel reduction is not a one-time measure—it typically needs to be repeated at 5- to 35-year intervals, depending on forest type. Although there are regular calls for more funds to be allocated to fuel reduction, it is difficult to assess whether this would be worthwhile given the paucity of quantitative information on the effectiveness of fuel reduction in lowering fire frequency and severity. There is a clear need for better information on the cost-effectiveness of fuel reduction.

The sums spent on fire suppression have also come under question, with federal and state agencies still placing undue emphasis on the strategy. Existing policies restrict the ability of officials to pursue cheaper options, such as suppressing one area of a fire but allowing another area of the same fire to be managed for wildland fire use. Critics have also argued that huge sums are devoted to fighting the largest fires, even though the probability of success is often low, simply because of public perceptions and liability concerns.

The existing framework for sharing fire suppression costs between federal and non-federal agencies also contributes to higher suppression expenditures by distorting incentives. Cost-sharing rules are inconsistent and vague, and state and local governments are responsible for only a small share of the costs of protecting communities near wildlands. This reduces their motivation to adopt building codes and land-use controls that could substantially lower spending on fire suppression. Although this failure has been recognized, it persists. The financial responsibilities of the various levels of government need to be more clearly and consistently defined, and a greater share of the burden needs to be placed on state and local governments. ■

► For the full discussion on this topic, see www.rff.org/weeklycommentary.

What's the Best Way to P

DON'T FORGET THE EMISSIONS PRICE



to Promote Green Power?



Carolyn Fischer and Richard G. Newell

Right now, the only thing that competes in the news cycle besides the war in Iraq and the upcoming election is green power, in all its forms. Consumers are buying compact fluorescent light bulbs, utilities are promoting their latest options, and the “experts” are claiming that their favorite source should prevail. And renewable energy sources—including geothermal, solar, wind, tide and hydropower—are a major component of most strategies for addressing global climate change. As it turns out, not all policies that promote renewables are created equal; our research shows that broad-based policies like emission fees are substantially more cost effective than more targeted approaches, such as research and development subsidies, if the goal is to reduce greenhouse emissions in the near and medium terms.

Many nations have proposed targets for renewable energy production that can only be described as ambitious, given the current levels and the short time frames involved. Proposals in the United States aim to increase renewable electricity production to 15 percent by 2020, a significant amount, given that hydropower capacity is extremely unlikely to expand. The targets set by the European Union are higher still, to produce 22 percent of electricity and 12 percent of gross national energy consumption from renewable energy sources by 2010.

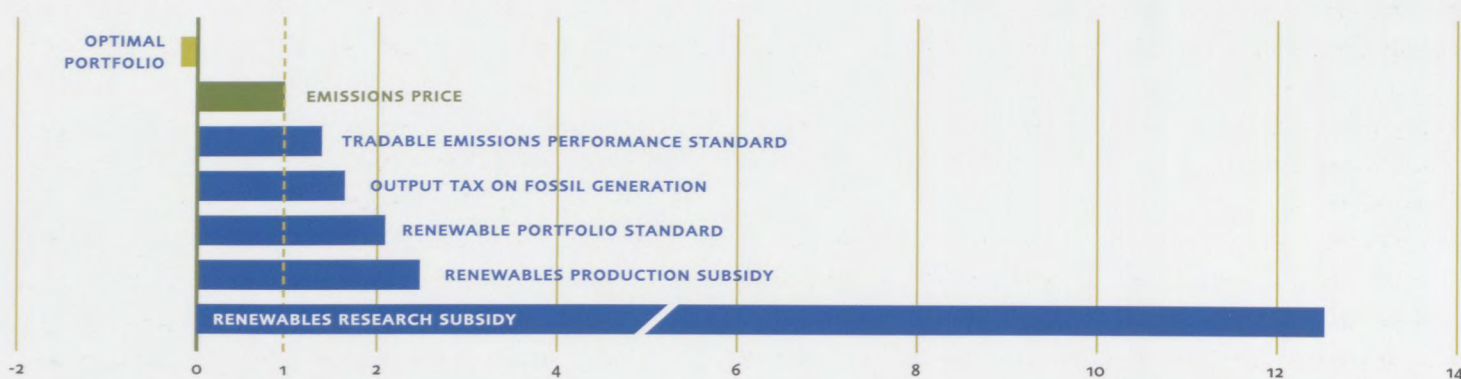
The feasibility of achieving these goals depends importantly on technological innovation that will lower the cost of these non-emitting energy sources. Toward these ends, Organisation for Economic Co-operation and Development (OECD) countries have implemented a wide range of policies to reduce greenhouse gas emissions and stimulate innovation in cleaner technologies. Policies implemented in OECD countries include the following.

- A carbon dioxide (CO₂) emissions price—via either an emissions tax or a tradable emissions permit system—provides incentives to reduce CO₂ intensity (that is, CO₂ emissions per unit of economic output) and makes fossil-fueled sources more expensive than renewables. Several Scandinavian countries and the Canadian province of British Columbia have implemented CO₂ taxes, and, in 2005, the European Union launched a program of tradable CO₂ emissions permits.
- A tax on fossil-fueled energy raises the price received by renewables through higher consumer prices for energy, favoring renewables

over fossil-fueled sources. The United Kingdom, Germany, Sweden, and the Netherlands tax fossil-fueled sources, in most cases by exempting renewable sources from an energy tax.

- A tradable emissions performance standard, or generation performance standard, mandates that the average emissions intensity per unit of output (for fossil-fueled and renewables generation combined) not exceed a standard. Such policies are considered for energy-intensive industries, such as certain sectors in the United Kingdom's Climate Change Levy.
- Renewable energy portfolio standards—also called market share requirements or green certificates—may require either producers or users to derive a certain percentage of their energy or electricity from renewable sources. Such programs have been planned or established in Italy, Denmark, Belgium, Australia, Austria, Sweden, and the United Kingdom, as well as in several states and provinces in the United States and Canada.
- A production subsidy for renewable energy boosts the price received by renewables and lowers their effective marginal cost relative to other sources, improving the competitiveness of these sources vis-à-vis fossil fuels. The United States has the Renewable Energy Production Incentive of 1.9 cents per kWh, and 24 individual states have their own subsidies. Canada has a Market Incentive Program, and several European countries and Korea have production subsidies.

Cost of Policy Scenarios Relative to Emissions Price



The use of a renewables R&D subsidy alone results in both very large R&D investments and forgoing near-term cost-effective abatement opportunities. Because cost-effective early emissions reductions are not pursued, all emissions reductions must be gained in later years by making renewables less expensive than fossil fuels without any emissions reduction or conservation incentives. This would require the cost of renewables to fall by a sizable 25 percent.

An emissions price alone is the most efficient single policy for reducing emissions because it simultaneously gives incentives for fossil energy producers to reduce emissions intensity, for consumers to conserve, and for renewable energy producers to expand production and to invest in knowledge to reduce their costs. The other policies offer different combinations of these incentives with correspondingly different consequences for the distribution and the overall size of the burden of meeting an emissions reduction target.

An optimal policy combines an emissions price with policies to capture spillovers in the market for knowledge, namely a proportional R&D subsidy and a small subsidy for renewable production. These corrective policies provide positive benefits, and allow the emissions price to fall by one-third to meet the same target.

■ Subsidies for R&D investment in renewable energy, including government-sponsored research programs, grants, and tax incentives, are used to encourage near-term and long-term innovations through targeted research. Major programs exist in the United States, the United Kingdom, Denmark, Ireland, Germany, Japan, and the Netherlands.

Economists typically argue that a direct price for CO₂ (a tax or tradable emissions permit system) would provide the most efficient incentives for development and use of cleaner technologies. In practice, a number of issues are at play and therefore numerous policies are being pursued. Some of these issues extend beyond economic efficiency, such as political acceptability and distributional questions. Others emerge directly from economic efficiency considerations; for example, spillovers in R&D markets reduce incentives for firms to innovate because a portion of the returns on their investments will be captured by others. Similarly, the innovation process may occur not only through R&D investments, but also through firms "learning" from the production and use of new technologies.

Most prior studies have focused on the effectiveness of emissions pricing policies, such as emissions taxes and emissions permits, for stimulating innovation in green technologies. The broader, more pragmatic set of policies, such as those using performance standards and supporting renewable energy, have generally been neglected.

To shed some light, we developed a modeling framework for the electricity sector that incorporates both a knowledge accumulation stage, when R&D and learning occur, and a knowledge application stage, when the cost-reducing benefits are realized. Using this consistent framework, we evaluated the six aforementioned policy options for their relative performance according to different metrics: emissions reduction, renewable energy production, R&D, and economic surplus. To better understand both the magnitude of the efficiency and cost differences among the policies, we applied our approach to a numerical model of the U.S. electricity sector.

We set an emissions price of \$7 per ton of CO₂ (or about \$25 per ton of carbon) throughout the model and used the resulting emissions as a target for the other scenarios, allowing for an apples-to-apples comparison. For the portfolio standard and the emissions performance standard, we held the price of credits constant across our two time stages, while meeting the implied emissions target. The resulting renewables portfolio standard rises from 6.0 percent in the first stage of the model to 9.6 percent in the second stage, which is close to a recent proposal for a national renewables portfolio standard that would rise from 5 percent by 2012 to 10 percent by 2020.

Our results indicate that the emissions price is indeed the most efficient means of achieving a given emissions target, leading to the least cost in terms of surplus and requiring the least investment in renewable energy R&D. Conversely, the renewables research subsidy is by far the most costly single policy for reducing emissions.

The figure on page 12 displays the relative costs of the policies as a ratio to the cost of the emissions price. An optimal combination of policies performs best and actually leads to a small cost savings with this modest emissions target due to induced innovation benefits. The renewable portfolio standard is roughly twice as costly as the emissions price, with the performance standard and the output tax lying in between. The renewables production subsidy is two-and-a-half times as costly, while relying on the R&D subsidy alone is a whopping 12 times more costly than utilizing a price on emissions.

When the ultimate goal is to reduce emissions, policies that also create incentives for fossil-fueled energy generators to reduce emissions intensity and for consumers to conserve energy perform better than those that rely solely on incentives for renewable energy producers. For the modest emissions targets we examined, a renewable energy R&D subsidy turns out to be a particularly inefficient means of emissions reduction—when used alone—because it postpones most of the effort to displace fossil-fueled generation until after the costs of renewables are reduced.

Although climate change is a long-term problem, our results for mid-term strategies emphasize the important role of policies that encourage abatement across all forms of energy generation and time frames, as well as the limitations of narrowly targeted policies.

Nonetheless, no single policy can simultaneously correct more than one market failure—in this case the failures associated with the emissions externality and the knowledge spillovers from learning and R&D. Each policy poses different trade-offs. In the presence of knowledge spillovers, an optimal portfolio of policies—an emissions price combined with optimal learning and R&D subsidies—can achieve emissions reductions at significantly lower cost than any single policy alone. (Yet the emissions reductions continue to be attributable primarily to the emissions price and the learning subsidy is small.)

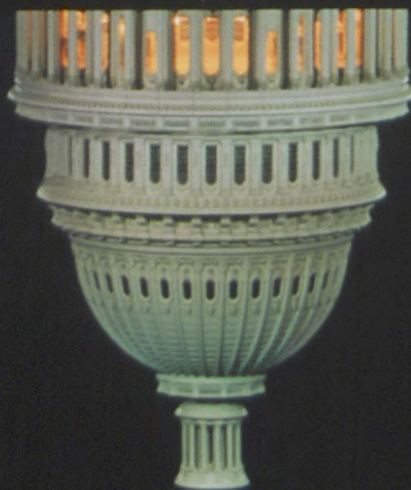
If even a modest emissions price is not politically feasible, an R&D subsidy by itself is not the next best policy, and the costs of that political constraint are likely to be quite large and increasing with restrictions on the remaining policy options. It should be kept in mind, however, that we chose to focus on reductions over the near- to mid-term and incremental improvement of existing technology, rather than the development of breakthrough technologies that might achieve deep reductions. R&D policies probably have greater salience in the latter context, but that should not diminish the role of emissions pricing to improve the competitiveness of all green alternatives in the market. ■

This article is based on a longer work by the authors, "Environmental and technology policies for climate mitigation," Journal of Environmental Economics and Management, 2008, 55(2): 142-162.



Trading Approaches on Climate
The Case for
“Climate Protection Authority”

NIGEL PURVIS





Our next president will face two major climate policy challenges. Congress is likely to take up legislative proposals to substantially reduce U.S. emissions through mandatory controls. Also, the United States and the rest of the international community have set December 2009 as the deadline for concluding a new global climate agreement before the controversial Kyoto Protocol expires in 2012.

This new round of climate negotiations provides a real chance to ensure strong, equitable action by all major economies, including the United States, China, and India.

The stakes are high. The Nobel Peace Prize-winning Intergovernmental Panel on Climate Change tells us we probably have one last clear chance to deal with the climate problem in time to avoid unacceptable environmental, economic, humanitarian, and security risks, but only if we act now.

The key to success will be integrating these domestic and international approaches. New domestic laws must help spur international cooperation. New international agreements must mesh with domestic strategies and political realities. Unfortunately, several major obstacles stand in the way.

First, America lacks a compelling bipartisan vision for how the United States should engage the world on climate change. Without further guidance, U.S. climate diplomats seem unlikely to thread the needle—crafting a politically acceptable, economically feasible, and environmentally effective climate agreement. Congress's hostility to the Kyoto Protocol showed that it will not accept an international consensus that it does not help design and shape.

Unless the United States starts speaking to the world with one consistent and credible voice on climate change, other nations will prove reluctant to make the politically difficult concessions that the United States will require before participating. Why should other nations negotiate with the president if they believe Congress is likely to reject the agreement anyway? In the absence of a bipartisan climate change foreign policy, furthermore, Congress may fail to design new domestic climate legislation with the international community firmly in mind. A go-it-alone approach would forgo the important opportunities domestic climate laws provide to entice and cajole other nations to do more to mitigate their emissions as well.

The climate bills in Congress today do not tie U.S. domestic and international climate policy together in a coherent manner, nor do they mobilize resources for international cooperation on the scale needed. Failure to make progress internationally, in addition, may make it harder to move climate legislation through Congress, since many legislators view equitable action by China, India, and other major emitters as essential.

Second, securing the two-thirds support of the Senate needed for U.S. participation in a new climate treaty would be a truly daunting task. The supermajority for treaties is among the highest bars imposed by the Constitution, equal to the standard for removing a president from office. The framers expected treaties to be relatively rare, maybe a few agreements with England, France, and Spain. Today, the United States enters into several hundred new international agreements each year that are essential for advancing U.S. national interests in a complex, rapidly globalizing world. As a general rule,

however, the Senate will not act on a treaty if a single member of the Committee on Foreign Relations asks for more time. These informal committee “holds,” as they are called, can last for years and even decades.

The Senate’s recent experience with the U.N. Convention on the Law of the Sea illustrates the challenge of moving a major treaty through that body. When these negotiations concluded in 1982, the Reagan administration expressed dissatisfaction with the result. At the request of the United States, the international community modified the treaty in 1994. The revised agreement has been supported by the past three presidents (including the incumbent), the U.S. military and national security community, major corporations, and leading environmental groups. Nevertheless, a very small but vocal minority in the Senate has blocked consideration of the agreement by the full Senate for more than a decade, although some progress has occurred recently. In light of U.S. treaty practice, many experienced foreign policy hands are skeptical about whether any economically costly climate change agreement could make it through the Senate, given both the inherent difficulty of that task and the controversial nature of the topic.

Why do these obstacles to U.S. global leadership on climate change matter? It’s hard to see how the United States could stabilize the planet’s climate without new international climate agreements. Until the United States commits itself internationally, other nations will hide behind U.S. unilateralism and inaction.

The truth is this. The United States has neither a sound climate foreign policy nor the right mechanism for creating one. Absent a fundamental change in the way the United States makes and carries forward its climate diplomacy, the next president and Congress may fail to do what is necessary to stabilize the Earth’s climate system in time to avoid disastrous consequences for the United States and the world. Now is the time to consider innovative alternative approaches. For inspiration, we should look to other more successful areas of international cooperation, specifically international trade.

The Trade Model

In the United States, trade policy is as contentious as climate policy. While progress on trade is episodic, the president and Congress eventually come together. Why? Partly because the United States employs a powerful tool that forces the president and Congress to cooperate. Specifically, Congress periodically grants the president Trade Promotion Authority (TPA), a comprehensive framework for negotiating, reviewing, and implementing trade agreements. TPA does the following:

- Authorizes the president to negotiate new trade agreements
- Enacts into law concrete and usually bipartisan negotiating objectives
- Requires the president to submit concluded agreements to Congress for final approval as congressional-executive agreements, which must be approved by a simple majority of both houses of Congress rather than by two-thirds of the Senate
- Creates mechanisms for improving coordination between the executive branch and Congress, sometimes through the creation of official congressional observer groups
- Guarantees that trade agreements receive a straight up-or-down vote without amendments, holds, or filibusters within 90 legislative days

Under TPA, U.S. negotiating positions carry more weight internationally because America speaks with one voice and other nations understand clearly what is required to secure U.S. participation. With TPA, other nations are more likely to make politically difficult concessions because they believe U.S. domestic approval is both probable and will occur without unwarranted delay.

Reasonable people differ on whether trade deals give sufficient attention to environment and labor challenges. Regardless of one's view on this, procedurally TPA works. Congress and the president almost always find common ground over time and the United States usually joins the trade agreements it negotiates. Almost all major trade deals negotiated by the United States over the past several decades have been done under some form of TPA, including the North American Free Trade Agreement (NAFTA) and the World Trade Organization (WTO) agreement.

Climate Protection Authority

The United States should apply the trade model to climate change by creating "Climate Protection Authority" (CPA). Importantly, there are no legal impediments. Over the past 70 years, U.S. courts and the weight of scholarly opinion have confirmed that virtually any international agreement the United States could enter into as a treaty, it may rightfully approve as a TPA-style congressional-executive agreement. The Supreme Court has said the decision to classify an international agreement as a treaty or a congressional-executive agreement is a political question for the president and Congress to decide alone.

Until now, the United States has tended to treat climate agreements as treaties, a product of historical accident and anachronistic tradition, rather than law and principle. The president and Congress remain free to take a different approach now. The rationale for TPA applies equally well to climate change. CPA would empower U.S. negotiators to bring home better agreements by making the United States a more credible and reliable negotiating partner. Other nations would know where the United States stands and what concessions are needed to secure U.S. participation. And they would have confidence that Congress would approve climate agreements in a timely manner without seeking to renegotiate key terms.

Global climate agreements are every bit as complex, lengthy to negotiate, difficult to conclude, and near impossible to renegotiate as trade agreements. The geopolitics of climate change are as challenging as the politics of international trade, perhaps more so because the benefits of freer trade are more immediate than the benefits of mitigating emissions. Global climate cooperation serves vital U.S. interests that should not be frustrated by a minority of the Senate.

CPA could work just like TPA. Congress would authorize the president to negotiate new congressional-executive agreements, define U.S. negotiating objectives and principles, create mechanisms for improving coordination between the two branches of government, and provide for a straight up-or-down vote in both houses of Congress on climate agreements within 90 legislative days, without conditions, holds, filibusters, or amendments.

The president and Congress now have before them an important opportunity to pass legislation that creates CPA. Most climate advocates and Capitol Hill watchers predict the United States will enact major domestic climate legislation in the next year or two. By enacting CPA at the same time it regulates U.S. domestic emissions, the United States could provide greater certainty about how domestic and international systems will evolve harmoniously. To establish credibility, the United States would agree to reduce its emissions to an economically manageable level without precondition. Simultaneously, the United States would offer to make initial U.S. emissions goals more stringent if other nations make equitable and verifiable commitments in international climate agreements. The legislation would make clear that such agreements would be treated as congressional-executive agreements that would be reviewed under the CPA process.

This conditional offer and promise of streamlined review would create powerful incentives for other nations to act, while reserving for Congress the final decision on whether international climate agreements advance U.S. national interests. Europe has already adopted this type of conditional stance. It plans to reduce its emissions 20 percent below 1990 levels by 2020, but it has offered to reduce emissions by 30 percent if all major emitters participate in an equitable global climate agreement.

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has neither a sound
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Reducing U.S.
domestic emissions
and promoting
international
climate cooperation
are vital national
security interests.

Political Reactions

How might the next president, Congress, and key stakeholders react to this proposal? There is reason for guarded optimism.

Two key players are likely to favor CPA from the outset. Every modern president has considered TPA indispensable for trade negotiations. A new administration might understand immediately that CPA would empower it to conclude good agreements by enhancing U.S. credibility and creating incentives for other nations to accept U.S. terms. The House, in addition, should prefer congressional-executive climate agreements to climate treaties because it would play no formal role in the latter but would have a role equal to the Senate in the former. Assuming continued Democratic control, the House's willingness to add CPA to new domestic climate legislation would depend on the attitudes of traditional Democratic Party stakeholders, including environment and labor groups.

The reactions of these groups, the business community, and the Senate are harder to predict. Contrary to what one might expect, the Senate has been pragmatic about congressional-executive agreements. Today, the Senate treats only six percent of U.S. international agreements as treaties; the vast majority of agreements take the form of congressional-executive agreements. In addition, Senate leaders appreciate the importance of U.S. participation in a new global climate pact.

The United States's refusal to join the Kyoto Protocol has become an unfortunate symbol of American unilateralism and "exceptionalism." Almost no change in U.S. foreign policy would better demonstrate a renewed American commitment to multilateral cooperation. Admittedly, the Senate has always had a vocal minority of staunch defenders of its treaty prerogatives, such as Senator Robert Byrd. The next president or the House would have to convince the Senate that the time has come to apply to climate change what has become the normal method of review for most international agreements in other areas.

The Senate will also listen carefully to the views of major U.S. companies; most now recognize that greenhouse gas regulation is inevitable. Once the outline of a major domestic climate law is clear, U.S. companies might come to the conclusion that CPA would provide greater regulatory certainty regarding how domestic and international climate systems will evolve than the traditional treaty process, under which the president has almost a free hand to conclude new agreements without congressional involvement.

Congress will also want to hear from labor unions and companies in energy-intensive sectors regarding competitiveness issues. Labor groups, of course, are firmly opposed to TPA, so the idea of extending that set of practices to climate change could seem highly unappealing. Yet, these players are sophisticated and they might take a second look at CPA if the mechanism were designed to help create a level international playing field. If well designed, CPA could increase the prospects of an agreement that obligated other nations to take comparable action and help insulate domestic competitiveness safeguards (such as border taxes) from WTO challenge.

The environmental community might embrace CPA so long as the approach does not slow momentum toward enactment of domestic emissions limits or allow Congress to set unrealistic international negotiating objectives. Environmentalists should support the general proposition that climate agreements should be held to the same Senate voting standards and receive the same preferential procedural treatment that trade agreements have enjoyed for decades.

Reducing U.S. domestic emissions and promoting international climate cooperation are vital national security interests. CPA would create an integrated strategy for tackling climate change at home and abroad. And that is exactly the kind of creative leadership that the American people hope for from the next president and Congress. ■

ENERGY, ENVIRONMENT, AND ELECTIONS:

MAPPING VOTER BEHAVIOR IN 2008

A CONVERSATION WITH JON KROSNICK

Jon Krosnick has extensively studied the psychology of American political behavior, with special attention to how policy debates affect voter preferences on a variety of issues. An RFF University Fellow, Krosnick has partnered with several RFF researchers to sample public opinion on energy and environmental policy questions, most recently in collaboration with ABC News and Planet Green and with the support of the Woods Institute for the Environment at Stanford University.

Among the questions his research has explored: How do the news media define which national problems citizens think are most important for the nation? How do the media shape how citizens evaluate the president's job performance? How does becoming very knowledgeable about—and emotionally invested in—a policy issue affect political thinking and participation? How do people's political views change as they move through the life cycle from early adulthood to old age?

Krosnick is the Frederic O. Glover Professor in Humanities and Social Sciences at Stanford, where he holds joint appointments as professor of political science, communications, and psychology. Resources asked him to reflect on how attitudes on environmental issues have evolved in recent years.

Resources: In comparing 2008 to previous election years, what is the biggest shift in public attitudes toward environmental issues?

Jon Krosnick: Without a doubt, the environment has been a greater priority among the American electorate in the last 12 months than in a generation—probably going back to the 1970s—and certainly greater than in any recent election cycle. That's because of two things.

During 2007, the news media grabbed on to climate change and drowned the public in coverage. Those stories eventually receded from the front pages, but they set the stage for what happened next. Energy—particularly as motorists experienced price-induced pain at

the gas pump—became more visible in the public eye than ever. Now we are finding that energy and its relationship to climate and other environmental issues rank among the top issues affecting voter judgments.

That is a big change. The environment has always been a poor cousin to issues like crime and education. Now it's front and center.

Resources: Will the economic impact of energy prices sway voter choices?

Krosnick: Normally, we don't see people's pocketbooks having much impact on their political thinking. For example, if you suffer economically, does that lead you to vote against the party in the White House? The answer is generally no, because when most individuals suffer economically, they don't blame it on the president. They blame it on their company's poor management of its finances, or they blame it on their boss, who didn't appreciate their talents and fired them.

Conversely, if people succeed economically—get a raise, a promotion, or whatever—they say, "Well, it's because I'm such a great person." They don't say thank you to the White House for their success. For the most part, when we see people voting based on economic considerations, it's actually a heartwarming phenomenon that we call sociotropic voting. Sociotropic thinking in the political arena means thinking based on what's good for the country, or the collective, rather than what's good just for me personally.

Voters aren't selfish; they consider the country as a whole. When people see the country doing well economically, they're favorable toward the party in the White House and tend to vote for it. When they see the country suffering economically, they're unfavorable toward that party and tend to vote against it.

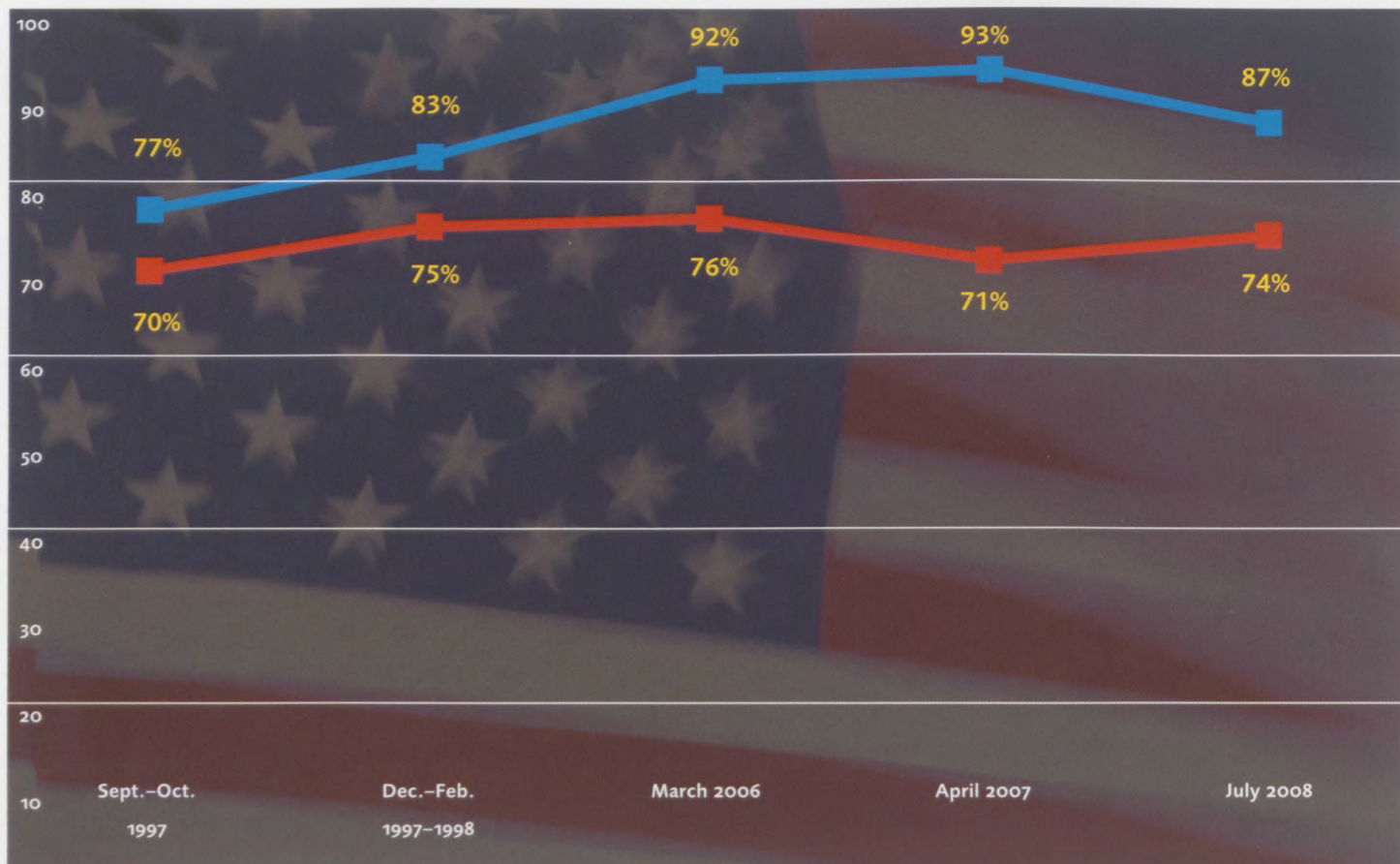
When it comes to energy prices, voters are likely to think the same way—they are likely to blame the White House at least partly

Is Global Warming Really Happening?

Percent of believers and how their views have changed over time.

■ Democrats ■ Republicans

Sources: Surveys designed and conducted by Professor Jon Krosnick in collaboration with Resources for the Future and ABC News, funded by the Woods Institute for the Environment at Stanford University, ABC News, *Time* magazine, *The Washington Post*, the National Science Foundation, Planet Green/The Discovery Channel, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and Ohio State University.



for gas prices across the country but not for their own personal pain at the pump. So a person's vote is likely to be influenced by perceptions of the nation's gas prices and efforts to reduce them. People will debate many questions—"Why exactly are gas prices as high as they are? Is it the speculators? Is it the supply? Is it the war in Iraq?" And the more they see the White House as having responsibility for current national conditions, the more people will vote accordingly. There is now a real sense of a connection between gasoline prices and the political system.

Resources: Are many voters concerned enough about energy and the environment to base their votes on those issues?

Krosnick: Absolutely. About 16 percent say that climate change is extremely important to them personally, and these people will use the issue when deciding how they will vote. That is about one in six people—a very large voter cohort compared to groups who are passionate about education, for example, or gun control, or abortion, or capital punishment. People who have strong environmental sympathies cut across all demographic boundaries, such as age, income, educational attainment, and gender. And when you are talking about one-sixth of the electorate, that's a number that can sway outcomes.

Resources: Does increasing interest in climate translate into increased awareness of environmental issues more generally?

Krosnick: Yes and no. In certain segments of the electorate, there is an activist movement that we haven't seen in a long time focused on grassroots environmental protection.

There has always been a chunk of people who call themselves environmentalists, but they're not really doing much about it. Maybe they'll send a check every so often to the Sierra Club, but that's it. Now, all of a sudden, an army of activists has emerged that is actually doing things. When we do surveys that ask, "are you reducing your carbon footprint?" or "are you now looking for products made in green ways over products that are not made in green ways?" we find that people are now doing much more than they ever have. They genuinely are changing their lifestyles—changing light bulbs to compact fluorescents and buying hybrid cars—and taking pride in saying, "I walk to work now four days a week. I ride the bus or a bike." And this phenomenon is up sharply in the last year.

Resources: What about other environmental concerns, like nuclear waste, endangered species, threatened ecosystems, and water scarcity?

Krosnick: They are much lower on Americans' list of priorities than climate change right now. Some people are quite concerned about each of those issues, but they represent much smaller fractions of the public. The environment is not so universally important to Americans across the board that anybody who's patriotic will say, "If you care about America, you care about the environment." There are no issues like that except for the economy and national security.

Resources: With regard to the 2008 presidential election, how will concerns about climate and energy factor into voter decisions?

Krosnick: What's really unusual about 2008 is how much the two candidates agree about the basic science of climate change, that the issue is a top priority, that it deserves considerable government action to address it, and that cap-and-trade mechanisms are feasible strategies. Barack Obama has offered a longer list of specific proposals for government intervention and action, including emissions reduction mandates. But if you stand back and squint at these two men, you certainly would not say, "This guy is saying go after climate change and this guy is saying no."

By agreeing on these basics, the candidates have transformed the debate into one focusing on the details. How exactly will energy supplies be expanded? How exactly will emissions be reduced? How exactly will the economic burden of energy prices be made more bearable for consumers? When the discussion focuses on details like

The environment is not so universally important to Americans across the board that anybody who's patriotic will say, "If you care about America, you care about the environment." There are no issues like that except for the economy and national security.

What's really unusual about 2008 is how much the two candidates agree that climate change is a top priority, that it deserves considerable government action, and that cap-and-trade mechanisms are feasible strategies. By agreeing on these basics, the candidates have transformed the debate into one focusing on the details.

these, Americans who care deeply about these issues will listen carefully to what the candidates say and evaluate them on that basis.

The campaign will hinge on what the candidates say about energy and the environment during the debates, on the ads they create, and on what their websites say. During the primaries, Obama had lots of climate change material on his website, and McCain had almost nothing. But as soon as he clinched the nomination, McCain expanded his website's climate change coverage considerably. More recently, energy and the environment have been the foci of lots of ads and speeches by both candidates. Votes will be won and lost as a result.

Resources: Is there some differentiation in how people feel about the environment and energy based on their party affiliation?

Krosnick: Yes, absolutely. Ten years ago when we started our collaborative surveys with RFF on climate change, we were really struck to see Democrats and Republicans basically agreeing that climate change is real, that it is caused by humans, that it can have bad consequences, and that something needs to be done about it.

Since then, we've seen gradual growth in the gap between Democrats and Republicans. Among the Democrats, larger numbers agree that climate change is a problem, whereas the Republicans have held steady over that time period. There is now much more of a partisan divide than there ever was. That's partly a function of the fact that our surveys began before the Clinton administration started its campaign for climate action and before we watched the Kyoto Protocol become attached to the Democratic party. After that, we watched a Republican administration take a skeptical stance about the issue. And so the cues that American citizens have been getting from the leaders they trust have been increasingly polarized along party lines.

Resources: How do Americans feel about a cap-and-trade policy to curb releases of carbon into the atmosphere?

Krosnick: Among all of the policy options for carbon reduction that we've investigated, cap and trade is the least appealing to the American public. If a cap-and-trade bill were passed right now by the Democratically controlled Congress, there's a real possibility that it would get a negative reception. Many people don't believe it will work.

Interestingly, when people are told that cap and trade is not a new idea and that it has been tried and tested, they become more positive toward it. But as of now, the vast majority of people are skeptical. They are much more supportive of government mandates to compel industries to use alternative fuels and non-carbon-based energy sources to reduce emissions. Even fewer endorse a tax on

carbon. A huge majority of Americans believe government should be doing more to encourage the market to respond to climate and energy concerns.

Resources: Have you found results that really surprised you in your polling?

Krosnick: Although huge majorities of the American public have believed that climate change has been happening, will be bad for societies, and should be addressed, every one of our surveys has shown a majority of people to misperceive scientists' views on these issues. Despite many Intergovernmental Panel on Climate Change reports and even a Nobel Prize, most Americans believe that scientists do not agree about whether climate change exists, about its causes, or about its seriousness. This surprised us a lot.

And when we set out to understand why this was happening, we found an important cause to be the news media's decisions about how to cover climate change. Seeking to be balanced in their coverage, the media have paid attention regularly not only to mainstream scientists but to a smaller group of skeptics as well, often in equal measure. Many climate stories have presented the findings of natural scientists, followed by comments from skeptics.

So we did a simple experiment, which found that adding just 45 seconds from a skeptic to one tv news story substantially increases people's perceptions of disagreement among scientists. It decreases their belief that climate change will be bad, as well as their belief that climate change is caused by humans.

Resources: You cited sociotropic thinking as a factor in how people feel about climate. Does it apply to other environmental resources?

Krosnick: Certainly. Research I've done with RFF scholars has shown that many Americans are willing to pay some of their own money to protect and preserve natural resources that they will never directly benefit from. If that sounds surprising, consider this.

Imagine I told you that a collection of meteors is heading toward Earth, and when they hit, they will wipe out the Grand Canyon, the redwoods in California, Mount Rushmore, and every other site of natural beauty in the country.

The thought of losing all that makes many Americans sad, even people who know they will never visit any of those places. Knowing that natural beauty exists and that other people can enjoy it is worth something. So if offered the opportunity to pay \$400 so that rockets could be sent to destroy the meteors in flight, many people would do it. And that's often the result of sociotropic thinking. ■

A Little Knowledge Makes an Impact

When people were told that cap and trade had worked in reducing acid rain, support rose from 43% to 57%.



Source: 2008 survey experiment designed and conducted by Professor Jon Krosnick and funded by the Woods Institute for the Environment at Stanford University.

RFF Board Seats Mark R. Tercek, Head of The Nature Conservancy

Until he became the president and CEO of The Nature Conservancy (TNC) in July, Mark R. Tercek was a managing director at Goldman Sachs. But Tercek says his new role has much in common with his previous position.

"As an investment banker," Tercek says, "I discovered that almost any problem can be resolved if smart people collaborate and work hard to design a solution. The same goes for environmental problemsolving." In investment banking, he worked in a global, highly decentralized way, collaborating with others to tackle financial problems. "At TNC," he says, "we do the same thing but focus on environmental instead of financial opportunities."

Tercek's career at Goldman Sachs began in 1984, soon after he earned his MBA at Harvard; he was made a partner in 1996. By 2005, having headed the consumer-health care, equity capital markets, corporate finance, and real estate departments, he was contemplating leav-

ing the private sector. But Henry M. Paulson, Jr., then chairman and CEO of Goldman Sachs and now U.S. Treasury Secretary, persuaded him to stay and work on environmental issues for the firm.

The result was the Center for Environmental Markets—one of the first such programs set up by an investment bank. Now, Tercek notes, "just about every financial institution has an environmental program: people realize it's good for business and positive for the environment as well."

Tercek's Center for Environmental Markets was RFF's partner in the U.S. Climate Policy Forum, which brought together executives from 23 companies representative of the U.S. economy; the resulting report offers market-based, politically sensible options for addressing climate change.

At Goldman Sachs, Tercek found RFF's nonpartisan, fact-based analysis of policy vitally important. Now, at The Nature Conservancy, he intends to pay especially close attention to RFF's work. RFF, Tercek observes, thinks about the same issues as TNC, albeit from a different perspective. Both organizations are addressing climate change. RFF's expertise is in finding market solutions for reducing emissions and sequestering carbon; TNC likewise takes market-based approaches, paying special attention to those involving conservation practices, such as forest carbon offsets and natural adaptation.

Tercek believes that climate change endangers everything TNC has accomplished—its 60 years' worth of effort to conserve 15 million acres in the United States and more than 100 million acres in 35 other countries. "All that is at risk, and climate change also challenges the organization's basic strategies going forward. If RFF's work leads to market-friendly programs that are accepted by society and effectively manage carbon, that's hugely germane and powerful for our conservation mission."



MARK R. TERCEK

Forest carbon offsets are "enormously attractive opportunities" because they offer a low-cost way to sequester carbon while protecting important stores of biodiversity. "Carbon markets will allow local people to have livelihoods consistent with being good stewards of the forests they rely on," he says. He expects the dollar flows associated with carbon sequestration to

reduce carbon emissions, increase conservation of biodiversity, and provide more sustainable livelihoods. Carbon markets can encourage alternative technologies that will help us transition from fossil fuels, he believes.

Looking beyond carbon markets, Tercek notes that decisionmakers need to better understand the value of ecosystem services that are often taken for granted or not fully valued in policy. This is an area of focus for TNC, which is working to assess the worth of ecosystems through the Natural Capital Project; partners in this endeavor are the World Wildlife Fund and the Center for Conservation Biology at Stanford University.

Tercek was elected to the RFF Board of Directors in April and will serve a three-year term. ■

If RFF's work leads to market-friendly programs that are accepted by society and effectively manage carbon, that's hugely germane and powerful for our conservation mission.

Peter Nelson Named RFF Communications Director

In April, Peter Nelson, a veteran Washington journalist and environmental researcher, was appointed director of communications at RFF. "We are delighted to bring to our team someone with Pete Nelson's experience and commitment to the public policy process," said RFF President Phil Sharp. "He will boost RFF's ongoing efforts to move our ideas on energy, environment, and resource issues into the mainstream of American opinion."

Nelson joined RFF in 1997 as a research associate and focused his work on environmental and transportation policy issues. "I've always been someone who's wanted to remain neutral and unbiased, and was drawn to RFF initially because of its great mix of research and analysis with policy focus, while remaining strongly independent and nonpartisan," Nelson says. For his work, he was named a co-recipient of the 2000 Vernon Prize from the Association for Public Policy Analysis and Management.

In 2005, he was appointed manager of a two-year strategic review of RFF's research and policy agenda, and beginning in 2006 he served as special assistant to the president for strategy. Nelson considers his history at RFF to be one of his biggest assets in his new position. "I learned a lot about RFF during the strategic review and, combined with my research background and experience here, I feel uniquely positioned to help communicate RFF's mission and work."

Nelson also brings an understanding of the world of communications from his background as a journalist, editor, and news bureau manager. In 1991-92, he was a founder and editor-

in-chief of *Greenwire*, a major online environmental news service that was created as an outgrowth of *The Hotline*, a daily political report. He is also the author of a widely-used training manual published by the International Center for Journalists for environmental reporters in developing countries.

Noting that there was no such thing as the worldwide web in his *Greenwire* days, Nelson sees opportunity and challenge in communi-



PETER NELSON

cating in today's media-drenched realm.

"The way that people get their information has changed dramatically over the last two decades, and continues to change. My goal is to expand RFF's reach in a way that stays true to its mission."

Nelson is a 1988 graduate of McGill University in Quebec. In 1997, he received a master's in public management from the School of Public Affairs at the University of Maryland. ■



RFF sponsors a summer internship program in which students from around the world work with the research staff. Pictured here are some of this year's interns. Top row, from left: Jason Fialkoff, Adrian Deveny, Swati Yanamadala, Ilana Wolk, Agatha Oforjebe, Huimin Tan, Raghavender Palavadi Naga, and Liguang Liu (Spofford Intern). Bottom row, from left: Danae Werthman, Yun Wu, Shahzeen Attari, RFF President Phil Sharp, Deborah Kuhn, Mallory Johnson, and Ina Clark.



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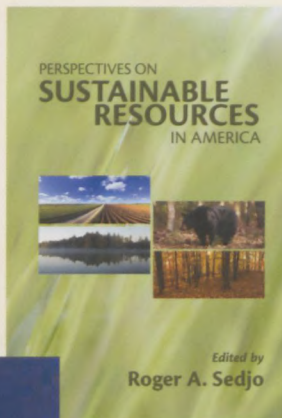
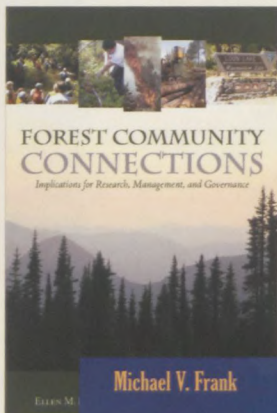
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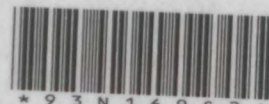


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