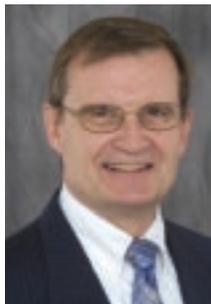


RESOURCES

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Fuel Economy in
America



PHIL SHARP

Our Compelling Mission

For more than half a century, RFF has been harnessing intellectual capital to the public good. Our scholars have made significant contributions in the analysis and design of critical environmental, energy, public health, and natural resource policies. I am delighted to join today's gifted team in building on the RFF legacy, and I am grateful to Paul Portney for his decade of skillful leadership.

No one doubts that America and the world face major challenges in managing our resources for the benefit of generations to come. The need for rigorous thinking and credible policy analysis is more crucial than ever.

Capitalizing on scholarship in the policy arena, however, has never been simple. Too often advocates and policymakers fail to appreciate the value of objective research or fear such research will undermine their political goals. And too often scholars fail to communicate in ways understandable to policymakers or focus research on questions with little apparent relevance to compelling public issues.

In carrying out its mission to improve environmental and natural resource policymaking worldwide through objective social science research, RFF has served as a bridge between these worlds. Today, spanning this divide is more difficult and more compelling than ever. The authority of scholarship has been under assault. Too much research has been distorted by ideology, partisanship, or profit—casting suspicion over findings and policy recommendations.

The global challenges we face—such as climate, change, loss of biodiversity, the spread of disease, and others—compel us to more effectively employ our intellectual capital. We must become smarter in our public discourse, wiser in our public policy choices, and more competent in implementing critical public policy. This is not about government versus the private sector; it is about the need for greater effectiveness from all of our institutions. And I believe the public will increasingly demand more of their leaders in every setting.

As we at RFF assert ourselves in this turbulent world, we must remain faithful to disciplined intellectual inquiry. To better grasp how we can continue to be effective and maximize our impact, RFF is undertaking a strategic review. You can help by contributing your thoughtful comments about what we do, how well we do it, and where we should head. In particular, I urge our friends and readers to help us identify emerging issues—those that are not currently bright on the public radar. Please send us your suggestions and thoughts to emergingissues@rff.org.

With your counsel and support, we are determined to make a difference in the lives of future generations.



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RFF Resident Scholar **Ruth Greenspan Bell's** interests focus on how to develop a more robust culture of environmental compliance in transitioning and developing countries. She directs the International Institutional Development and Environmental Assistance initiative, a program designed to help countries build more effective environmental protection systems.

Timothy J. Brennan is an RFF senior fellow and professor of public policy and economics at the University of Maryland-Baltimore County. An expert in the areas of economics of law, electricity, ethics, and markets and competition, his work focuses on public policies toward monopolies and market power. With RFF Senior Fellow Jim Boyd, Brennan has analyzed constitutional requirements for compensation for public use of private land.

Ian W.H. Parry, an RFF senior fellow, studies policies pertaining to transportation, tax, public health, and the environment. His focus extends to a wide range of policy approaches to address the social and political costs of motor vehicle use, including optimal gasoline taxes, the cost-effectiveness of policies to reduce traffic congestion, and the costs and benefits of tighter fuel economy standards for cars and light trucks.

Katherine N. Probst is an RFF senior fellow. She has worked in the field of environmental policy for almost 25 years and is an expert on Superfund and other hazardous waste management programs. She was lead author of *Superfund's Future: What Will It Cost?*, a report requested by Congress that assessed the cost of the Superfund program to EPA for fiscal years 2000 through 2009.

RFF Fellow **James N. Sanchirico's** work focuses on economic analysis of fisheries and ocean issues, ranging from investigation of the effects of closing off areas of the ocean to commercial fishing to the design, implementation, and performance of market-based instruments, such as individual fishing quotas. An overarching theme of his research is understanding the potential benefits and costs of zoning the oceans, an approach akin to zoning land.

Resource Links

To learn more about the feature stories in this issue, the following links will take you to special pages on the RFF website, where you will find additional resources:

- *Should Fuel Economy Standards Be Raised?*
www.rff.org/shouldfueleconomystandardsberaised
- *Superfund at 25: What Remains to Be Done:* www.rff.org/superfundat25
- *Public Use and Just Compensation: How and When Does Economic Analysis Apply:*
www.rff.org/publicuseandjustcompensation
- The report mentioned in *Reducing Emissions from Electricity Generators: Looking at the Costs and Benefits*, on page 6, can be found at www.rff.org/nyserda.
- The report mentioned in *Politics Hamper U.S. Agricultural Assistance for Africa*, on page 13, can be found at www.rff.org/africanagriculturalassistance.

RFF Welcomes New President Phil Sharp

The historic mission of RFF is to enhance the ability of this country and other nations to make effective policy—to bridge the gap between rigorous analysis and the political machinations needed to implement good policy,” says RFF’s new president, Phil Sharp. “Three devastating hurricanes, the war in Iraq, 9–11, and other recent crises make it even clearer how crucial this mission is to today’s policy communities.”

An experienced legislator, authority on energy and environmental issues, and policy analyst, Sharp assumed his new role in September, bringing a portfolio of expertise that encompasses the worlds of policy, legislative initiatives, elective politics, academia, and law.

Over a span of four decades, Sharp’s distinguished career includes service as a U.S. Representative from Indiana for 10 terms, from 1975 to 1995. Since leaving Congress, he has been affiliated with the John F. Kennedy School of Government at Harvard University and was a senior policy adviser at the Washington law firm Van Ness Feldman.

“My years in Congress and my experiences at the Kennedy School impressed on me the enormous need for credible information on which to base good policy decisions,” says Sharp. “The thing many policymakers



Phil Sharp became RFF's new president in September.

find so difficult is determining who—or what—they can trust.”

RFF, Sharp notes, is one of the few institutions with a demonstrated commitment to sustaining the credibility of its research, a place where he finds individuals motivated by a desire for new knowledge that can be applied nonjudgmentally to create effective policies.

Long-Term Credibility rather than Short-Term Gain

“One of the reasons I felt so eager to return to the Washington policy world is what I perceive as a pronounced deterioration in public discourse over the last 15 to 20 years,” says Sharp. “For many reasons, the public conversation—in the media, in debates on Capitol Hill, even in academia—has become strident and polarized. The motivation behind every pronouncement is suspect, and too many exchanges are increasingly based on mistrust.”

One reason for this deterioration, Sharp says, is that “today we are an enormously distracted society. We have multiple sources of entertainment and information—one might say

an excess of bread and circuses. It has become hard to sustain a conversation on a serious topic for very long.”

Moreover, the digital revolution—while a major advance as a policy tool—also constitutes a major challenge to serious research. “Today, anyone can be a pundit and say just about anything with seeming authority. This development also has tended to cause the public to disparage the credibility of research pronouncements,” he says.

A final threat to credibility arises when ideology and profit motivate research, says Sharp. “How can people judge or assess the quality of research that may have been bought and paid for or driven by political motives? This only reinforces the importance of RFF anchoring itself to solid independent analysis. Long-term credibility rather than short-term gain will best serve our interests.”

As part of his initial work at RFF, Sharp will lead a strategic review of RFF’s research programs as well as all other work done in support of the research effort. He believes that such a review is appropriate given the change in leadership.

“It has been nearly 10 years since we conducted a thorough look at how we are organized, what our priorities are and ought to be, and how we sustain ourselves for another 50 years,” he says. “The Board feels, and I agree, that now is the best time to undertake this important task.”

A Career Focused on Energy and Resource Policy

Sharp’s combination of talent and experience distinguished him from an extensive list of candidates considered by the RFF Board in an exhaustive international search.

“Based on his multi-faceted background as a longtime member of Congress and his broad experience with our policy issues, Phil quickly emerged as the obvious choice to take RFF into a new era of excellence and influence,” said Frank Loy, RFF’s Board chair.

Prior to his election to Congress, Sharp was a professor of political science at Ball State University from 1969 to 1974, and before that was a legislative aide to Indiana Senator Vance Hartke, from 1964 to 1969. Following his decision not to seek an eleventh consecutive term in the House, Sharp joined Harvard’s John F. Kennedy School of Government, where he was a lecturer in public policy from 1995 to 2001 and director of the Kennedy School’s Institute of Politics from 1995 to 1998.

During his 20-year congressional tenure, Sharp took a leadership role in development of energy legislation, including the Clean Air Act Amendments of 1990 and the Energy Policy Act of 1992. In 1977–1978, Sharp chaired an energy task force instrumental in fashioning a compromise plan that phased out price controls on oil and natural gas over several years. He was chairman of the Energy and Commerce Subcommittee on

Fossil and Synthetic Fuels, from 1982 to 1986, and the Energy and Power Subcommittee, from 1987 to 1995. He also chaired the Secretary of Energy’s Task Force on Electric Systems Reliability, which issued its report in September 1998, and was a member of the Committee on Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards, which issued its report in 2001. Sharp was elected Majority Whip At-Large for the 99th Congress.

He currently is co-chair of the Energy Board of the Keystone Center, and chair of the Electricity Advisory Board of the Commission for Environmental Cooperation. He also serves on the National Academy of Sciences’ Board of Energy and Environmental Systems.

He is a member of the boards of directors of the Energy Foundation; the Cinergy Corporation; the New England Electric Power Co. (a subsidiary of National Grid USA); and Proton Energy Systems, Inc. He was a senior policy advisor on energy, environment, and land- and water-use issues in the Washington offices of Van Ness Feldman, a Seattle-based law firm focused on energy and environmental law.

Born in Baltimore in 1942, Sharp was raised in Elwood, Indiana. After a year at DePauw University, he transferred to Georgetown University’s School of Foreign Service, where he graduated *cum laude* in 1964. He spent the summer of 1966 at Oxford University, and received his Ph.D. in government from Georgetown in 1974. ■

Barack Obama Suggests Strategies to Secure America’s Energy Future

Facing record-high gasoline prices and forecasts of skyrocketing home-heating costs this winter—exacerbated in the aftermath of Hurricane Katrina—Senator Barack Obama of Illinois called the American energy situation “a clear and present danger to the U.S. economy (that) will not subside.” In fact, he predicted, “it’s only going to get worse.”

Obama presented his views on energy policy in a recent speech entitled “Securing Our Energy Future,” given as part of the RFF Policy Leadership Forum series.

Declaring that “the days of running a 21st century economy on a 20th century fossil fuel model are numbered,” Obama, a Democrat elected to his first term in 2004, called on his fellow lawmakers to support and adopt more challenging policy measures to alleviate U.S. dependence on oil. “Limited supplies and an unprecedented growth in demand have sent the global oil market teetering toward the edge of disaster. All this means that the price of oil is going to be reaching levels we just can’t handle any more.”

Obama charged that the federal government has been aware of the hazards posed by the nation’s dependence on foreign oil for years. “Despite constant warnings by researchers and scientists, major corporations, and

our own government officials, [oil dependency] is a danger our government has failed to prepare for, failed to listen to, and failed to guard against.”

Passed by Congress this summer, the new Energy Policy Act’s “solutions are too timid and reforms are too small,” Obama stated, adding that he voted for the bill because it offered “baby steps” in the right direction. He stressed the need for more short-term action, including building refinery capacity and expanding the strategic petroleum reserve, as well as investing in clean coal technology, increasing renewable fuels to 20 percent of total energy use, and fitting all cars with flexible fuel engines by 2010.

Obama highlighted the particular need for policy reform toward the automobile industry, noting that the largest source of U.S. dependence on

oil comes from the cars Americans drive. U.S. demand for oil is not sustainable, he stated, and drilling in the Arctic National Wildlife Reserve (ANWR), which the energy law supports exploring, would only meet U.S. petroleum needs for one month. “ANWR is clearly not the solution,” he said.

As Brazil nears energy self-sufficiency through biofuels and China and Japan produce and purchase huge numbers of fuel-efficient vehicles, the oil-dependent U.S. auto industry risks being left behind, he said. With health-care costs for its retirees alone climbing year after year, the industry claims it cannot keep pace on technological development, which potentially throws the entire sector into turmoil. According to Obama, \$1,500 from each General Motors vehicle sold today goes toward retiree health care.

“This isn’t just costing us energy efficiency,” Obama said. “It’s decimating American businesses and costing American workers their jobs.” He laid out several policy options to help the beleaguered industry increase capacity in hybrid and alternative fuel technologies, including direct subsidies and consumer tax credits.

He specifically called for an increase in the CAFE (Corporate Average Fuel Economy) standards of 3 percent per year for 15 years, rather than a one-time large increase, to give automakers a chance to develop energy-efficient auto technology over time. The savings from this, he predicted, could be enormous: a 40-miles-per-gallon requirement on all cars could reduce U.S. oil consumption by one billion barrels per year by 2020.

Obama also recommended that the government shoulder 10 percent of U.S. auto companies’ retiree health-care costs and require that automakers invest half of these savings in clean technologies. He estimated the cost of taking on this burden would be \$670 million—a relatively small amount of money that could be funded through closing a tax shelter loophole.

Concluding his speech, Obama reiterated the need for policymakers to take prompt and significant action to reduce American dependence on oil—for the benefit of the environment, the economy, and geopolitical security. “Ultimately,” he said, “we see a nation that can’t control its future as long as it can’t control the source of energy that keeps it running.” ■

Senator Barack Obama of Illinois spoke at RFF’s Policy Leadership Forum on Sept. 15.



Reducing Emissions from Electricity Generators: Looking at the Costs and Benefits

The electricity sector is a major source of emissions of several air pollutants, including sulfur dioxide (SO₂), which contributes to acid rain and fine particle concentrations in the atmosphere; nitrogen oxides (NO_x), which contribute to both of these pollution problems and to ground-level ozone; and mercury, which is a toxic substance linked to neurological and other health problems. The effects of SO₂ and NO_x emissions are particularly strong in New York and other northeastern states, which are downwind of the large number of coal-fired generators located in the Mid-Atlantic states and the Ohio Valley.

Recent federal policy proposals to reduce emissions of SO₂, NO_x, and mercury from the electricity sector—including the U.S. Environmental Protection Agency’s (EPA) recently adopted Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR)—promise important improvements in air quality and reductions in acid deposition in New York State and across the nation. But what are the costs of achieving these reductions? The answer depends on the form and stringency of the regulation. In a recent study funded by the New York State Energy Research and Development Authority, RFF researchers Karen Palmer, Dallas Burtraw, and Jhih-Shyang Shih analyzed



the costs and benefits of CAIR combined with a variety of restrictions on mercury emissions.

The study found that benefits to the nation and to New York State significantly outweigh the costs associated with reductions in SO₂, NO_x, and mercury, and all policies show dramatic net benefits. Of the four policy scenarios considered, the one that resembles EPA’s final rules for SO₂, NO_x, and mercury is the one with the highest net benefits. However, this finding does not imply an endorsement of EPA rules for two reasons: first, modeling indicates that additional SO₂

reductions would yield benefits in excess of their incremental costs; second, the benefits of mercury reductions are not formally analyzed.

CAIR and CAMR

In 2005, EPA adopted two new rules that together address SO₂, NO_x, and mercury emissions from the electricity sector. With CAIR, EPA caps emissions of SO₂ and/or NO_x in a large region covering more than 20 states and the District of Columbia. This regulation allows for emissions trading and banking, and restrictions are imposed in two phases, the first beginning in 2010 (2009 for NO_x) and the second in 2015. In the first phase, the program will allocate 3.7 million tons of SO₂ allowances and 1.6 million tons of NO_x allowances to electricity generators in the region. In 2015, the total allocations for annual emissions will drop to 2.6 million tons for SO₂ and 1.3 million tons for NO_x.

In the second new rule, known as the Clean Air Mercury Rule (CAMR), EPA has adopted a national plan to reduce mercury emissions from electricity generators using a cap-and-trade approach applied to all coal-fired generating units in the nation. The rule allows for emissions banking and will distribute allowances for 38 total tons of emissions annually from all coal- and oil-fired electricity generators beginning in 2010, and 15 tons beginning in 2018.

Policy Scenarios

Using an electricity market simulation model, the researchers analyzed four different policy scenarios that coincide with recent proposals. All of these scenarios include CAIR in its originally proposed form in combination with different approaches to reducing mercury emissions from electricity generators nationwide.

1. CAIR plus CAMR: This scenario models the costs and benefits of CAMR coupled with CAIR as it was first proposed. Under this scenario, the seasonal cap-and-trade program for NO_x for electricity-generating units in the State Implementation Plan (SIP) is discontinued.

2. CAIR plus CAMR and seasonal SIP NO_x policy: This scenario includes the continuation of the seasonal cap-and-trade program for NO_x emissions from electricity-generating units in the NO_x State Implementation Plan Call region, which includes 19 states from Massachusetts to Alabama and west to Illinois. Although absent from the original proposed CAIR rule, a seasonal NO_x program is reconstituted in the final rule.

3. CAIR plus tighter mercury standards with MACT: This scenario combines the SO₂ and NO_x portions of scenario 1 with a national requirement that all coal-fired generators achieve either a 90 percent reduction in mercury emis-

sions or a target emissions rate of 0.6 pounds of mercury per trillion Btu of heat input, whichever is less expensive at the particular facility.

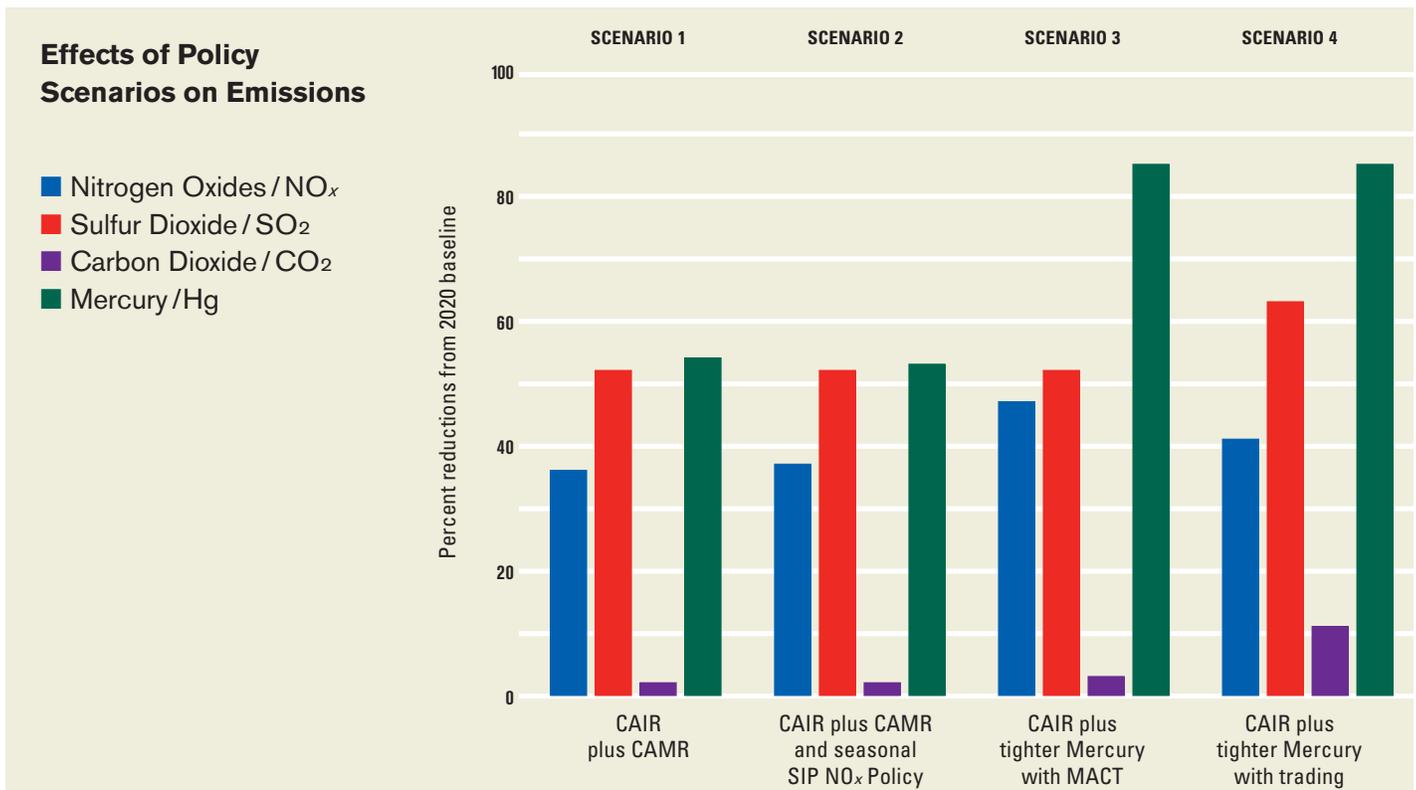
4. CAIR plus tighter mercury standards with trading: This scenario models CAIR coupled with a national cap-and-trade program for mercury in which the national annual emissions cap for mercury in each year is set at the level realized under the MACT rule modeled in scenario 3.

Results

The researchers found that for both New York State and the nation, the benefits of each policy scenario significantly outweighed the costs associated with reductions in SO₂, NO_x, and mercury, even under cautious assumptions about the valuation of the expected health effects. Depending on the policy, between 10 and 13 percent of the total national health benefits associated with reduced emissions of SO₂ and NO_x occurs in New

York State due to the state's large population and its location downwind of major emissions sources. Net benefit estimates are based on a calculation of expected improvements in human health resulting from changes in particulate matter and ozone concentrations.

As shown in the figure below, all of the policies produce substantial reductions in SO₂, NO_x, and mercury emissions in 2020, and scenario 3, tighter mercury standards with trading, leads to ancillary reductions in CO₂ emissions of more than 10 percent. The mercury policies modeled in scenarios 3 and 4 lead to further reductions (by about 67 percent) in mercury emissions beyond those called for in the CAMR rule. An important environmental effect of the tighter mercury standard is that it brings about substantial reductions in emissions of SO₂. In scenario 4, when trading is allowed in order to achieve the tighter mercury standard, the SO₂ cap no longer binds in 2010 and sub-



sequent years because generators rely more on installation of pollution controls that reduce both mercury and SO₂ and less on controls dedicated to reducing mercury alone.

Nationwide, of the four policy options and the set of environmental benefits we consider, the CAIR policy coupled with CAMR and the continuation of the NO_x SIP Call has the highest net benefits—on the order of \$14 billion (1999\$) in 2020. Although this policy comes closest to the one embodied in the EPA’s final CAIR and CAMR rules, two important qualifications preclude an endorsement of the final rules. First, this study indicates that the benefits of an SO₂ reduction beyond the CAIR rule far exceed the costs. The cost of an additional ton of SO₂ reduction beyond the requirements of the CAIR rule ranges from \$350 per ton in 2010 to \$1,300 per ton in 2020. An earlier study by Spencer Banzhaf (also of RFF), Dallas Burtraw, and Karen Palmer finds that the average benefit per ton of SO₂ reduced, which is equivalent to the marginal benefit, is on the order of \$3,000 per ton. The large difference between marginal benefits and marginal costs suggests that further reductions in SO₂ emissions beyond those in CAIR would be justified on economic grounds.

Second, the mercury policy analysis does not consider the health benefits of reduced human exposures to mercury in the environment. However, recent research by Glenn Rice and James Hammitt at Harvard’s School of Public Health on the benefits of mercury emissions reductions associated with the Clear Skies Initiative can be used to infer estimates of potential benefits of different levels of mercury control. Benefits can also be inferred from reduced acidification that would result from lower SO₂ emissions un-

der the tighter mercury standard with trading scenario. This information suggests that inclusion of health benefits from the tighter mercury standard would reduce the difference in net benefits between the policy scenarios that include the tighter mercury controls and the policy scenarios that include the EPA mercury cap (CAMR).

The effect of the EPA policies on the fuel mix used to supply electricity is fairly modest, with only a slight switch away from coal to natural gas, which accounts for just 4 percent of the reduction in SO₂ emissions. Scenario 3 produces a similar result. The switch from coal to natural gas is larger under scenario 4, accounting for roughly 19 percent of the reduction in mercury relative to the baseline. These results suggest that with tighter mercury standards (beyond those included in EPA’s CAMR), a MACT approach preserves the role of coal in electricity generation better than a cap-and-trade approach does.

The results of this analysis contradict one important finding of EPA’s analysis of the proposed version of the CAIR rule: contrary to EPA’s findings, the RFF analysis finds that CAIR as originally proposed would not keep summer emissions of NO_x from electricity generators in the SIP region below the current SIP seasonal NO_x cap. In the final CAIR, EPA added a seasonal NO_x cap to address seasonal ozone problems and thereby increased the net benefits of the multipollutant policy relative to the original proposal. The main finding, however, is that the benefits of CAIR dramatically outweigh the costs. Indeed, the study provides substantial support for further reductions in SO₂ even beyond those achieved by CAIR. ■

Designing Policies to Protect Coral-Reef Ecosystems

by *James N. Sanchirico*

Coral reefs take centuries to develop. At the current rate of degradation, 60 percent of the world’s coral reefs could disappear in the next 30 years. The result will be essentially irreversible harm to the Earth’s most diverse living ecosystems, which support fish and marine animal habitats and provide important protection for coastal communities from storm damage, tsunamis, and erosion. Sociocultural and economic losses will also be substantial because reefs—and the food and services they provide—are important sources of employment, recreation, and tourist income in developing countries throughout the world.

The general causes of the decline are well known and include overfishing, destructive fishing practices (for example, fishing with dynamite or poison to get the fish out of the reef), and increasing levels of pollution driven by human migration to coastal zones. What is not well known, however, is how coastal residents adapt their behavior and practices to these changes in the marine environment. In addition, very little information is known about how coastal residents in less-developed countries rely on their local marine environment for food, recreation, and social well-being.

A colleague at the University of Miami, Dr. Kenneth Broad, and I have developed a socioeconomic household survey to better understand these



GEOFF SHESTER

the marine environment is healthy and does not need protection. Jobs are often scarce in the outer islands of the Bahamas, and creating no-take zones could reduce a household's ability to earn a living in tough economic times, many responded.

Some survey respondents, however, do not see any conflict between the need for jobs and no-take areas, because they believe that a no-take zone could be used to increase tourism. No-take zones can signal to potential tourists that the marine environment off an island is healthy, thus they have the potential to differentiate a community from other outer islands competing for tourist dollars. Such competition is a likely future scenario, but today many of the outer islands lack the necessary infrastructure for sustainable tourism.

We continue to analyze the household survey information to better understand the two missing pieces that currently hinder the ability to design policies to address the reef crisis. Only when governments understand how local residents rely on the sea can they best design and evaluate measures to protect the reefs without negatively impacting local livelihoods. ■

In addition to the generous support of the Marisla Foundation that made this summer's fieldwork possible, this project is supported by a National Science Foundation Biocomplexity grant, and an EPA STAR grant.

issues. Our focus is on the Bahamas, an archipelago of hundreds of islands in the Caribbean. The Bahamas provide a special opportunity for this work, because the country is currently in the political process of revamping its marine management, and marine resources remain relatively intact because of the country's large size and relatively small population.

This past summer, an RFF summer intern (Sarah Wise), a College of Bahamas undergraduate (Everton Joseph), and a UC–Berkeley graduate student in anthropology (Amelia Moore) went to Eleuthera, Bahamas, to survey households in the Tarpum Bay settlement. Students from Stanford and the University of Miami had participated in fieldwork sessions on Bimini, Abaco, and San Salvador in previous summers. With the addition of this summer's surveys, over 600 Bahamian households have been interviewed.

Even though data analysis is just beginning, we are already finding patterns in behavior and responses to our survey questions. For instance, many adults in the more remote outer islands

of the Bahamas are adapting to marine degradation by working multiple jobs to make ends meet. Fishing is often a second or third occupation, whereas three generations ago, residents were more dependent on fisheries for their primary source of income.

Both locals and fishery managers view fishing as having the largest impact on the local marine environment, and many believe that creating no-take zones could address these impacts. Local knowledge often points to coral reefs or mangroves as good locations for a no-take zone.

Those opposed to fishery closures list several reasons, including that the economic losses will be too great, that the sea is common property, or that



RFF Scholar Testifies on the Changing Face of U.S. Climate Policy

In testimony before the Senate Committee on Energy and Natural Resources this September, RFF Senior Fellow Richard Morgenstern outlined critical shifts in the climate change debate since early negotiations around the Kyoto Protocol and laid out key considerations for U.S. policymakers on the issue.

Morgenstern's comments came in response to the recently adopted Senate climate change resolution (S.A. 866), which calls for a "national program of mandatory, market-based limits and incentives on greenhouse gases ... that (1) will not significantly harm the United States economy; and (2) will encourage comparable action by other nations that are major trading partners and key contributors to global emissions."

Drawing on recent proposals by the National Commission on Energy Policy and options set forth by members of Congress, Morgenstern presented an altered landscape of the climate change debate, one that focuses not on steep, near-term reductions but on long-term technology innovation, short-term inexpensive emissions reductions, and international action.

"New technologies are clearly needed to address the climate change issue," he said. "Government has an important role to play in spurring [their] development and diffusion." He noted that while industry typically drives inno-

vation, policymakers must provide incentives to make the pursuit of such innovation worth the investment.

Outlining why climate change technologies are not currently attractive to investors, Morgenstern stated, "There is no market value associated with emission reductions. Further, the prospect of future value—which is driven by policy outcomes—is highly uncertain." He finds that market-based policies are likely to be most attractive to innovators, as they place value on reducing emissions at pres-

Policies that only focus on technology adoption fail to take advantage of reductions that could come from existing technologies and conservation.

ent, while encouraging firms to develop and implement new technologies in the future. In contrast, he says, "policies that only focus on technology adoption fail to take advantage of reductions that could come from existing technologies and conservation."

Morgenstern touched on two other design issues relevant to the Senate resolution. In light of concerns over mandatory cap-and-trade emissions

programs, he encouraged a "safety valve" or price cap approach. Although sulfur dioxide and other cap-and-trade programs have enjoyed success without such measures, he said, "carbon controls are potentially more costly to the economy than these other programs, and, most importantly, there is greater uncertainty about the true costs." A safety valve would keep the economy secure while maintaining emissions control.

Morgenstern also addressed how developing countries might participate in emissions control agreements, calling it a critical need for the long-term success of any effort to address climate change. However, "so far, no proposal has made much headway in this area." He applauded the Senate's approach in its recent resolution, which suggested linking climate change controls to other international concerns.

"If one believes, as I do, that the key to international cooperation on climate change is linkage on a broad range of issues, including global trade, development aid, and technology transfer," he stated, "then such a procedure would potentially provide Congress an opportunity to influence the actions of both developing and developed nations as climate policies evolve over the next few years," while limiting impacts on the U.S. economy.

Morgenstern said these changes in thinking pave the way for the future of climate change policy in the United States—and that all factors must be considered to create a truly effective policy system. "The debate has now shifted," he concluded, "to motivating both the public and private sectors to pursue technology innovation over the long term and capturing the low-hanging fruit of cheap emission reductions, all the while protecting the economy from unwarranted burdens." ■

No Magic Solutions: What Is Wrong with Current Plans to Manage Climate Change

Ruth Greenspan Bell

With the notable exception of official U.S. policy, much of the world is convinced, with varying degrees of intensity, that dramatic greenhouse gas reductions are necessary to combat global warming. The question for most countries is how to achieve them.

The conventional wisdom has settled on an approach with essentially two legs. One is a complement of sophisticated global greenhouse gas emissions trading systems, modeled on the U.S. cap-and-trade system to

control acid rain. The second is a belief in the inevitable power of advancing technology to solve complex problems.

The trading system outlined in the Kyoto Protocol established two mechanisms: the Clean Development Mechanism, which facilitates trading with the developing world, and Joint Implementation, in which a donor country invests in pollution abatement measures in a host country in return for credits that it may use in meeting its own pollution abatement

targets. A European Union trading system also recently started up, and there are some purely domestic systems in Europe.

Such trading systems operate on the assumption that the opportunity to profit from greenhouse gas emissions reductions will motivate generators of carbon dioxide (CO₂), wherever they are located, to make the necessary changes in how they operate their polluting power plants and factories. Advancing technology, the second leg, will make it possible for them to do this.

There is an inherent myopia in both approaches that cries out for examination. The almost exclusive focus to date on trading, for example, ignores the most important element of the U.S. model: the *cap* in cap and trade. It is the cap—the commitment to make genuine, steady reductions in the harmful emissions—that makes or breaks the overall scheme.

Caps have never worked without serious compliance efforts, backed up by old-fashioned commitment to enforce against laggards and cheaters. Global trading requires exactly the same attention to conventional regulatory processes as does effective domestic regulation—CO₂ reductions won't just magically happen.

It is difficult to judge whether global trading is a realistic option or a pipe dream, because very little evi-



dence exists. Sure, the U.S. model works. But its trading element is a technique to increase the efficiency of a classic regulatory program to control sulfur dioxide (SO₂). The SO₂ market isn't remotely laissez-faire: regulators demand a steady decrease of emissions over time, and transactions are regulated down to small details and vigorously enforced. Because "air" is the commodity, traders use mandated and rather elaborate accounting measures and work in such complete transparency that transactions are tracked on EPA's website.

Environmental trading as it is done in the United States has never been tested on a global scale. The best that has been achieved domestically in CO₂-critical countries like China, India, and Brazil is a handful of administratively managed trades between carefully selected polluters. In part, this is because few such countries can make the requisite commitment to capping pollution in reality, not just in their formal laws. Nor do many have the skills or adequate judicial systems to manage or enforce complex, intangible property rights such as polluted air from the pipe of a factory.

So what else will motivate plants that currently have a free ride to pollute to clean up their act? This is where the technology part of the argument comes into play: through Joint Implementation, outsiders with the incentive to control CO₂ emissions will install technology. It is true that any firm in any part of the world can recognize that someone offering free equipment, for example to capture CO₂ from flue gases expelled by power plants and other sources, is offering something of value. The tricky part is whether the manager of that plant has any incentive to pay the running costs of the equipment, to keep it running night and day, in and

day out, and to clean it from time to time. Normally, none of this happens without a watchful eye in the form of disinterested enforcement. Experience in China demonstrates that even plants equipped with adequate pollution equipment are not consistently running those controls when doing so proves inconvenient.

The leaders who are quite rightly pointing attention to the perils of greenhouse gases must take the serious step of committing to the cap in cap and trade. There is no other way but for the countries whose cooperation is needed for a global trading scheme to implement the fundamentals of environmental regulation.

With hundreds of thousands of CO₂ sources to be managed, it is not enough merely to have formal laws and ministries, most of which already

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They may prove to be
influential models.*

exist. Assistance is critical to help each country build realistic practices for effective regulation, monitoring, inspection, and enforcement. Specific help can range from training to provision of computers and monitoring equipment. The public in at least some of the countries can be made a partner and watchdog to reinforce environmental enforcers. The overall objective must be to develop the ambitious but necessary culture of environmental compliance that will ensure that CO₂ is kept under control.

Sporadic efforts have been made to develop regulatory capacity, particularly in the former Soviet Bloc following the fall of the Berlin wall. But the help has not been consistent and systematic. More often, development assistance simply tried, unsuccessfully, to insert practices from the Western economies into developing world law, traditions, and culture. Instead, we should ask what practices will work in the very different conditions posed by the growing CO₂ emitters, and how do governments institute the reforms, country by country.

With help, persistence, and political will, the regulatory skills of the large and growing CO₂ emitters can be improved. Progressive multinationals, including General Electric and Shell, are not waiting for the U.S. government before acting. They may prove to be influential models.

Building capacity to deliver verifiable, credible ongoing reductions of greenhouse gases is tedious work. Attention to the cap in cap and trade requires a steadiness of purpose, a longer view, and major assistance efforts that lack the romance of trading. Technology and trading will play a role. But focusing on the cap is more real than believing in the magic of the market—and it might actually achieve something. ■

Politics Hamper U.S. Agricultural Assistance for Africa

Never before has the gap between the world's rich and poor been more glaring. The problems are particularly acute in sub-Saharan Africa, where nearly half the region's 700 million people live on less than one dollar a day and a third lack basic food security. And sub-Saharan Africa's situation is deteriorating: it is the only region of the world where poverty and hunger are projected to increase over the next two decades.

Agriculture can be a catalyst for economic growth and poverty reduction. Agricultural development encompasses a wide range of investments, activities, and policies that foster rural economies and reduce poverty and hunger. Examples include natural resources management, improved land tenure systems, liberalized trade rules, and job creation through value-added processing of agricultural commodities.

To evaluate U.S. policies that address African rural development, RFF University Fellow Michael R. Taylor and Partnership to Cut Hunger and Poverty in Africa Executive Director Julie A. Howard studied aid agencies, interviewed agency staffers and stakeholders, and made site visits to Ghana, Mali, Mozambique, and Uganda. Their report, sponsored jointly by RFF and the Partnership was issued in September.

Taylor and Howard find that U.S.

agricultural development assistance to Africa is a complex web of competing policies and interests. At the U.S. Agency for International Development (USAID) top-down budgeting is combined with bottom-up strategic planning. Many other U.S. agencies also provide bilateral assistance to African agriculture. One of these, the Millennium Challenge Corporation, established in 2004 to implement the Millennium Challenge Account (MCA), would depart from traditional U.S. approaches by directing aid to countries that create an enabling environment for economic growth through market-oriented policies, good governance, and investment of their own resources in health and education. President Bush has pledged \$5 billion annually by FY 2006—a 50 percent increase over the current \$10 billion annual funding for development and humanitarian assistance.

Since September 11, 2001, however, support for agricultural development in Africa has competed unsuccessfully with needs in Afghanistan, Iraq, and Sudan. Political considerations have caused a shift away from agriculture-led economic growth in favor of health and education.

Even within the existing framework for funding agricultural efforts, congressional earmarks limit the flexibility and thus the effectiveness of aid programs. At least 90 percent of USAID's assistance is preallocated to microenterprise, plant biotechnology, and other areas that are not necessarily priorities. Domestic politics also increase the costs of assistance when Congress sets requirements to procure U.S. food and ship it to Africa in U.S. ships, tie aid to procurement from U.S. sources, and use U.S. contractors.

Aid for agriculture in sub-Saharan African is spread across 24 countries

and 4 regional programs and then further subdivided among contractors and grantees. Fragmentation of resources raises questions about scale and coordination: projects may not be large enough to have a lasting effect, and there is no mechanism to reconcile USAID programs with those of other U.S. agencies or multilateral institutions.

African agriculture assistance should grow at least as fast as overall foreign development assistance, Taylor and Howard contend. But simply committing more resources is not enough: policy and structural features of the current aid system need reform. Among their recommendations:

- Reduce political overhead. More of the resources appropriated for agricultural assistance should actually reach the ground in Africa.
- Reduce fragmentation. Larger and more focused programs managed by fewer vendors would help ensure that U.S. investment adds up to meaningful improvement.
- Improve donor coordination. Programs should be coordinated with those of other agencies into coherent investment strategies.
- Foster local ownership with a new funding mechanism. USAID should support funding for countries that manage resources with transparency and accountability. The MCA approach would insulate aid from politics, but its scope is limited, and MCA remains untested as a vehicle for development assistance. Congress and the administration should create a similar, unearmarked fund specifically for Africa to support rural economic growth in countries that meet the criteria. ■

“Our Wake-Up Call Is Here”

Recent disasters highlight unsustainable path for petroleum in the United States

With the nation counting the human and environmental tolls from the double wallops of Hurricanes Katrina and Rita, substantial attention also turns to the effect of those natural disasters on energy in the United States. As Steven Percy, former CEO of BP America, notes, “We have seen a gathering storm around the issue of whether or not we have adequate petroleum to carry our economy and society into the future.”

In this context RFF and GLOBE USA (Global Legislators Organization for a Better Environment) convened “Energy 2050: The Future of Petroleum,” the fifth in a series of briefings funded by the Henry M. Jackson Foundation on the state of energy in the United States. The briefing, moderated by Percy, featured Matthew Simmons, chairman of Simmons & Company, International, and was hosted by Representative Roscoe Bartlett (R-MD) and Representative Vernon Ehlers (R-MI).

Looking at the current situation, Simmons declared, “Our energy wake-up call is here.” He noted, “The full impact of Katrina is just barely starting to emerge,” calling the storm “our energy 9–11.” He pointed out that petroleum supplies in the United States were already threatened by increased domestic and international demand and turmoil in the Persian Gulf, while

rigs, refineries, and processing were all effectively operating at 100 percent. The storms left at least 18 oil rigs adrift in the Gulf of Mexico and crippled refining capacity for an unknown period of time.

Yet industry response to the situation underestimates how long term the impacts will be. “The timeframe to rebuild is very hazy,” Simmons said. “I think the industry right now unfortunately is lulling itself into believing ‘this is going to be a few weeks,’ when we should probably realistically be saying we were out of spare parts before Katrina, and rebuilding some of this stuff might take a long, long period of time.”

Simmons cited 20 years of “poor data,” along with bad analysis, wrong signals sent by low gas prices, and “strong opinions overruling fundamental facts” on policymaking as causing the current dilemma. He stated that “the single most important thing we can do now is energy data reform”

We’ve gotten so utterly spoiled by low oil prices that we have no idea what prices should be.

but that Americans need to consider a drastic change in how transportation is used. The public, too, seems ill prepared to respond to a crisis in the petroleum industry. Despite the fact that demand for oil was supposed to peak 10 years ago, he said, today fully 70 percent of U.S. oil consumption goes to transportation, and consumer demand continues to grow.

Simmons feels many current suggestions for fixing the oil problem will not adequately address the situation. Hybrids alone will not be sufficient, he said, because turning over the auto fleet

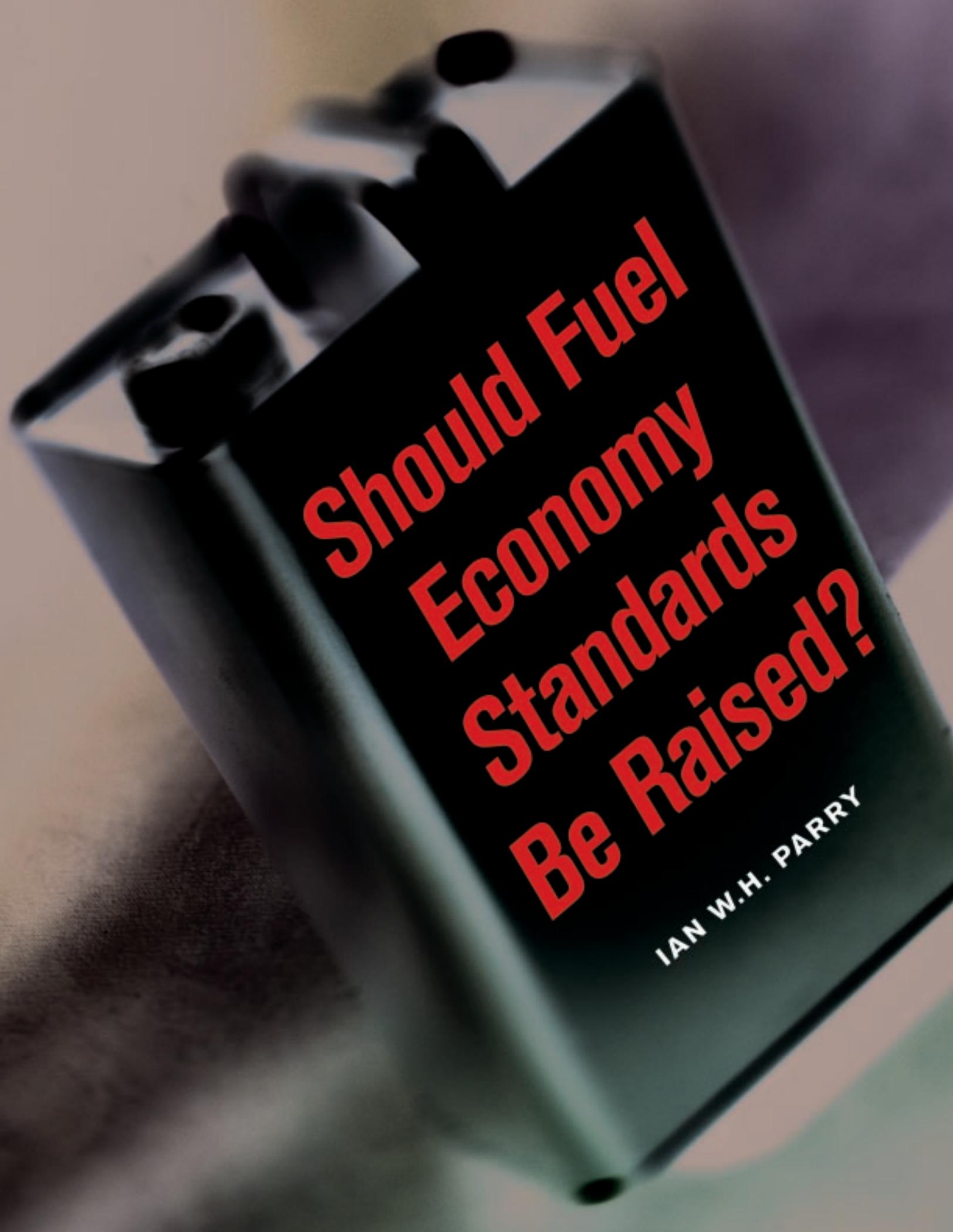
won’t happen fast enough to make a big dent—“and we need a big dent.” Percy noted that studies have shown if consumers can afford to drive farther, they will, which might result in an unchanged demand for gasoline. Simmons believes increased taxes on gas will not curb the appetite for oil, either, stating that people will then blame higher prices on the taxes, rather than consider changing behavior.

“We’ve gotten so utterly spoiled by low prices that we have no idea what prices should be,” he said, suggesting instead that we return to shipping goods by vessel instead of truck, stop making long commutes, and eat locally instead of consuming produce from around the globe.

Beyond these measures, however, Simmons calls for “a research and development explosion, the likes of which we have never seen, to invent some new forms of energy that don’t exist today. We should have energy laboratories springing up all over America . . . we haven’t tried for 100 years to invent a new energy source.”

Percy echoed the call for increased research. “[It] offers a great opportunity for entrepreneurs and innovators who can come up with energy solutions,” he said. He also noted that the problem extends beyond U.S. borders, with much of the increased demand coming from places like India and China, so any solutions must have a global focus. “We can flatten our demand, we can even have our demand go down, and we’re still going to see growth there unless something is done in those places.”

Simmons concluded by stressing the need for immediate action. “Ingenuity is the byproduct of panic,” he said, “and we now have a good reason to panic. We should have started (Plan B) a decade ago, but I’d say today is a lot better than tomorrow.” ■

A hand is holding a black book with red text. The book is tilted, and the text is written in a bold, sans-serif font. The background is a soft, out-of-focus gradient of colors.

**Should Fuel
Economy
Standards
Be Raised?**

IAN W.H. PARRY

W

ith every shift in the geopolitics of oil and accompanying spike in gasoline prices, the public call goes out to increase the fuel economy standards for new passenger vehicles. Domestic energy security and global climate change are the two rationales most frequently cited. A 2002 report by the National Academy of Sciences underscored the feasibility of achieving a substantial improvement in vehicle fuel economy and documented a wide array of emerging fuel-saving technologies that might pay for themselves in terms of fuel savings over the vehicle life.

But despite all the rhetoric, recent regulatory proposals have been modest. The standard that each manufacturer must meet, on average, for its sales of light-duty trucks (sport utility vehicles, minivans, and pickups) is being increased from 20.7 to 22.2 miles per gallon by 2007. And if a recent administration proposal is adopted, the standard will be further increased to 24 miles per gallon by 2011. Even so, the resulting fuel economy improvements from these changes would ultimately reduce our total oil use by only around 3 percent. Meanwhile, the standard for cars, currently 27.5 miles per gallon, has not been raised since 1990. In fact, due to the rising share of light-duty trucks, which now account for half of new vehicle sales, fuel economy averaged across all new passenger vehicles is still below its peak level achieved in 1987 (see the figure on page 19).

Does all this mean there is a solid economic case for a substantial tightening of the car and light-truck standards, if only the political will was there? The answer, surprisingly, is not at all clear cut; in fact, the debate over fuel economy standards may detract from more pressing policies to address energy security and environmental concerns.

Energy Security

The United States currently imports 57 percent of the oil it consumes, and this share is projected to grow to around 70 percent by 2025. Growing dependence on foreign suppliers is not a problem in and of itself, if it is less costly to meet additional oil needs through overseas purchases rather than by producing extra oil at home. The concerns about oil dependency really boil down to the vulnerability of our economy to energy price shocks and the possibility that oil profits earned in certain other nations may be undermining U.S. foreign policy and national security interests.

On closer inspection, it is not immediately obvious why oil price volatility warrants government regulation of private markets. Presumably some individuals and many businesses are well aware of oil price volatility and the risk that gasoline prices may rise in the future. It makes sense for them to take this risk into account when deciding how much to invest in energy-saving technologies and fuel choices, and when choosing among vehicles with different fuel economies. If markets work efficiently in terms of supplying energy-saving technologies demanded by consumers and firms, and the government is no better informed than the private sector about the risks of price volatility, there seems little basis exists for government intervention to alter private-sector decisions.

But perhaps private markets do not adequately account for the risks to the broader economy from oil price shocks. For example, a sudden jump in prices at the pump might push the economy into a recession when, to help pay for expensive gasoline, households reduce their demand for other goods causing other people to lose their jobs.

A further type of market failure has to do with market power issues rather than oil price volatility: higher demand from U.S. importers as a group may bid up the world price of oil, which in turn raises the nation's total import bill. Individual motorists and firms do not consider this price effect when deciding how much fuel to consume. However, the ability of the United States to influence world oil prices is unclear, as it depends on how the Organization

Higher fuel economy standards may fail a cost–benefit test, unless consumers greatly undervalue fuel economy, which is an open question. We are left with either rationalizing standards in other ways, for example on political rather than economic grounds, or considering alternative policy options.

of Petroleum Exporting Countries (OPEC) and other oil-producing nations respond to changes in U.S. imports.

Energy economists have attempted to estimate the cost to the nation resulting from both market power issues and the risk of macroeconomic disruptions from price volatility. Perhaps the best is a 1997 Oak Ridge National Laboratory study that put the combined costs at the equivalent of around 12 cents per gallon of gasoline. The main difficulty with these types of studies is forecasting the risk of future price shocks. These may have risen in recent years with elevated risks of terrorist attacks on oil supply infrastructure and possible regime change in Saudi Arabia (the swing oil producer) as well as pressure on the oil market from demand growth in China and other developing nations.

A broader, noneconomic concern about our thirst for oil is that it may be, inadvertently, counterproductive to the Bush administration's twin goals of furthering democracy abroad while strengthening security at home. Buoyant oil revenues may have emboldened Russia in its crackdown on democratic freedoms because they reduced the country's vulnerability to any threat of Western sanctions; similarly, surging oil profits may have encouraged Iran in its pursuit of nuclear weapons capability. In addition, oil dollars may ultimately end up funding terrorist groups. All these types of costs are especially difficult to put a price tag on.

However, we do not have as much leverage to curtail these revenue flows through regulating our automobiles as we would like. Suppose, for example, that over the next decade or two, we managed a substantial boost in passenger vehicle fuel economy from its current average of around 24 miles per gallon to 36 miles per gallon. This would reduce U.S. oil

imports by roughly a quarter, which might lower the world oil price by around 3–6 percent, or \$1.80–\$3.60 per barrel at current prices of \$60 per barrel. This reduction counts for something but is modest when set against the recent tripling of world oil prices.

Yet another issue is the expense, and human suffering, from U.S. military deployment in the Middle East, which has escalated enormously since the war in Iraq. However it is questionable how much money and how many casualties are attributable to the protection of oil supplies as opposed to other objectives, such as the promotion of stability and democracy in the region. Pacification of the Sunni triangle or a Palestinian-Israeli deal over Jerusalem and the West Bank will more likely determine when and how many troops come home than a modest reduction in U.S. oil imports.

Climate Change

Yale University economist William Nordhaus has taken on the daunting task of attempting to value the potential damages from future, human-induced global climate change, which involves assessing, among other things, the costs to agriculture, forestry, fishing, etc., as well as the costs of protecting valuable coastal regions against sea-level rise. This task also involves inferring how many resources countries might be willing to sacrifice to preserve ecosystems or avoid the spread of tropical diseases. Estimating these costs is challenging enough because of the paucity of studies for other countries, which means costs must often be extrapolated from U.S. studies. But the most contentious issue, and the one that accounts for the lion's share of Nordhaus's estimates, is the unknown

possibility of *abrupt, catastrophic* climate change, such as a disruption of the Gulf Stream that would (paradoxically) freeze northern Europe. Here, Nordhaus had to rely on the subjective views of experts on the likelihood, at different levels of warming, of a catastrophic event that would wipe out a large portion of world GDP.

Recent reviews of Nordhaus's work and other studies have put the damages from today's carbon emissions at roughly \$30 per ton. This figure is equivalent to about 120 percent of the 2003 price of coal but just 7 cents per gallon of gasoline, since a gallon contains only 0.0024 tons of carbon. Not surprisingly, this \$30 estimate is controversial given scientific, social, and political uncertainties, such as vulnerability of poor countries to climate change and the morality of current generations assessing the value of the environment for future generations. Nonetheless, one conclusion is unavoidable: according to economic models, most of the low-cost options for reducing carbon emissions are in other sectors, particularly substituting other fuels for coal in electricity generation, not in gasoline conservation.

Implications for Fuel Economy Policy

Summing up, the combined damages from oil dependency and carbon emissions that have been quantified seem to suggest, albeit tentatively, a ballpark estimate of around 20 cents per gallon of gasoline (the National Academy of Sciences panel assumed a larger figure of 24 cents per gallon). Now to the harsh realities of economics. The best way to address these costs would be to make fuel users pay for them through fuel taxation; that way, individuals would take these costs into account when deciding how much to drive, whether to buy a car with higher fuel economy, and so on. But we already have gasoline taxes imposed at the federal and state level that average about 40 cents per gallon—well above our estimate of oil dependency and carbon damages. Basic economic analysis shows that if people are already paying more than the full social costs of fuel use, a policy that further reduces fuel use, such as tighter fuel economy standards, will cause an overall economic loss to society, despite the climate and energy security benefits.

Many people will feel that there must be something wrong here. One possibility is that the damage estimates discussed above are missing something important, are flawed in some other way, or may turn out to be higher in the future as oil production becomes more concentrated in the Persian Gulf or if global warming occurs faster than expected. We need to keep an open mind about these possibilities, which will not be resolved until more evidence on these issues becomes available.

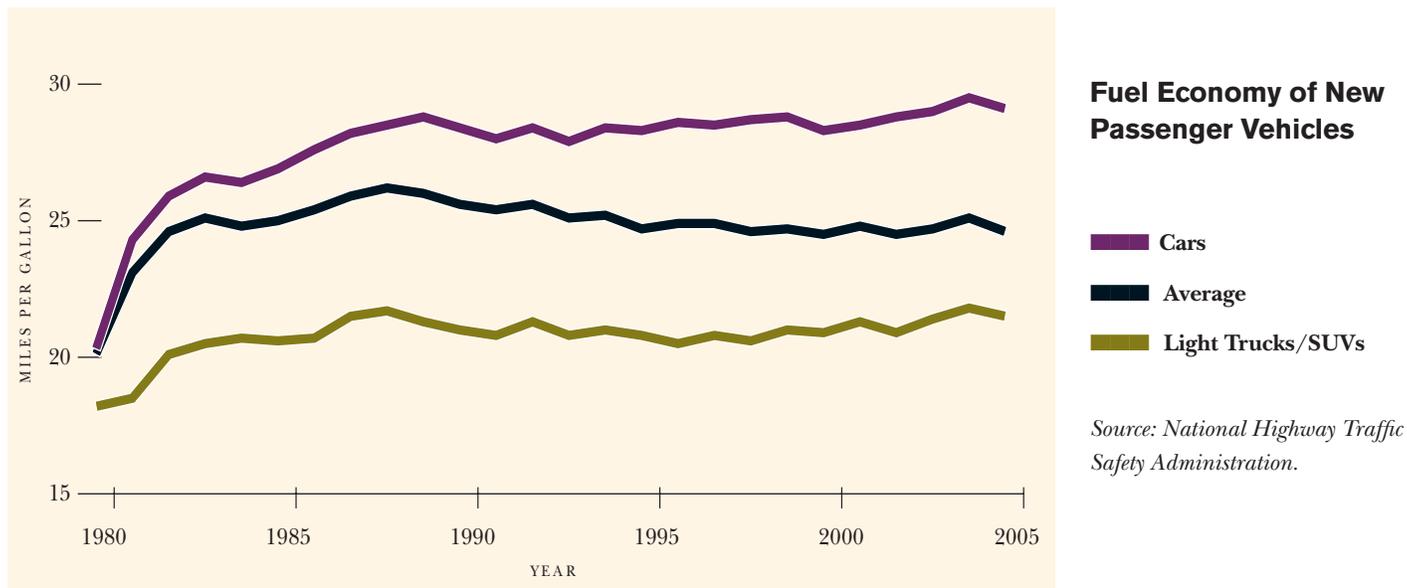
Another response might be that gasoline is under- rather than over-taxed if we take into account the other social costs of driving, such as traffic congestion and accidents. However, unlike higher gasoline taxes, higher fuel economy would slightly increase the amount vehicles are driven and add to congestion and accidents, rather than reducing driving, because it lowers fuel costs per mile (as opposed to a gasoline tax, which raises driving costs). Accounting for the perverse effect on driving further increases the net costs of higher fuel economy standards.

A third response might be that since gasoline tax revenues help pay for highway expansion and maintenance, shouldn't the benefits of this spending figure into the analysis? In principle, yes, but this does not undermine the argument. Higher fuel economy standards lead to lower gasoline demand and lower tax revenues; to the extent that this crowds out socially desirable highway spending, the net cost of reducing gasoline demand is larger not smaller.

Finally, even if we accept the above damage estimates as the best available, there is still great uncertainty surrounding them, not least the possibility of future catastrophic climate changes. But given that, according to the National Academy of Sciences study, the costs of significantly raising vehicle fuel economy are not too burdensome and perhaps could be negative when fuel savings are considered, surely we have little to lose from insuring against climate and energy security risks by boosting fuel economy?

Even this seemingly sensible argument is open to question. If it really is the case that emerging technologies exist that will pay for themselves in terms of fuel savings, then it follows that because consumers should be willing to pay higher vehicle prices for them, these technologies should be incorporated over time by vehicle manufacturers. The growing popularity of hybrid vehicles suggests that at least some households are happy to pay more for a vehicle that saves on fuel costs. If pump prices in excess of \$2 per gallon persist for the foreseeable future, tighter fuel economy regulations may have little or no effect over what the market would do on its own.

Another possibility is that the true economic costs of deploying fuel-saving technologies are greater than just the added costs to vehicle manufacturers, as estimated by the National Academy. This would be the case if, by using technologies to improve fuel economy, other vehicle enhancements that might have been made with the new technologies are sacrificed. During the 1990s, for example, many new technologies were used to improve vehicle horsepower; if regulations had forced them to instead be used for improving fuel economy, significant costs would have been imposed on vehicle buyers.



Yet another possibility is that the market simply fails because consumers don't place a high value on fuel economy and, as a result, manufacturers are unwilling to invest in fuel-saving technologies. For example, many auto industry experts believe that consumers only count the fuel savings from better fuel economy over the first 3–5 years, rather than the expected 14-year lifespan of the vehicle. If so, there is another potential justification for fuel economy regulations, as they force manufacturers to incorporate technologies that are worthwhile from society's perspective (even ignoring climate and energy security benefits) and that would not be adopted in the absence of regulation. Whether consumers do or do not undervalue fuel savings in this regard is much disputed among economists and engineers; unfortunately, there is little solid evidence on this issue either way.

To be blunt, higher fuel economy standards may fail a cost–benefit test, unless consumers greatly undervalue fuel economy, which is an open question. We are left with either rationalizing standards in other ways, for example on political rather than economic grounds, or considering alternative policy options.

Alternative Strategies

Thinking beyond the fuel economy debate, two hard truths should be recognized. First, any attempt to cut back on oil use or carbon emissions should focus on the economy as a whole. It makes no sense to focus exclusively on automobiles when the huge bulk of the low-cost opportunities for carbon reduction lie in power generation. Similarly, oil should be conserved by taxing all of its products, including aviation fuel, home-heating oil, diesel fuel, and petrochemicals, not

just the 45 percent of oil that is refined into gasoline.

Although imposing moderately scaled taxes on all oil uses—and on the carbon content of all fossil fuels—makes a lot of sense, the second hard truth is that these measures by themselves will not take us very far in alleviating energy security and climate concerns. The heart of the matter is whether we are able to develop and deploy technologies in the United States and throughout the world that enable a transition away from traditional fossil fuels, or at least prevent their emissions from escaping into the atmosphere, without seriously damaging economic growth. To what extent this transition materializes over the next generation or two depends on technological possibilities and factors that motivate firms, governments, and academic institutions to explore alternatives to traditional fossil fuel technologies, particularly the level of fuel prices—including energy taxes—and government policy toward R&D. In this regard, the architects of the Energy Policy Act of 2005 deserve a little credit for providing some incentives for technological advance. ■

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Superfund at 25: What Remains to Be Done

By Katherine N. Probst

Superfund turns 25 this year, but the program is in the press much less frequently than it was in its early years, or even in the 1990s. Now if there is a newspaper story, it is almost certainly about a specific contaminated site or about funding shortfalls in the cleanup program. Even though the Superfund landscape is relatively quiet, many important questions have yet to be answered about the program and what it has accomplished. Hundreds of sites across the country have been remediated, but there's not enough money to finish work on the sites already designated, never mind the new ones that are still being added. How did this come to pass? And what can be done to invigorate the Superfund program to address the challenges that remain?

Putting Superfund in Perspective

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known "Superfund," was signed into law by President Jimmy Carter on December 11, 1980. It signaled a major change in the federal government's approach to addressing sites contaminated with hazardous substances.

CERCLA put in place a two-pronged approach to assure that sites would be cleaned up. First, it created a powerful liability system to get former and current owners and operators of contaminated sites (the "responsible parties") to pay for and clean up sites themselves. Second, it created a designated trust fund to pay for site studies and cleanups where responsible parties could not, or would not, foot the bill. The original law authorized the program for five years at \$1.6 billion, with an annual budget of \$320 million. It also created a new set of excise taxes on petroleum and on chemical feed-

stocks that generated the majority of the program's funds. The logic was to raise the bulk of the funds for the new program from the set of companies most likely to have generated the hazardous chemicals creating the risks to human health and the environment in the first place.

Perhaps the most important decision EPA made in the early years was identifying those sites where trust fund monies could be used to pay for long-term cleanups. While Superfund's liability provisions can, in fact, apply to any contaminated site in the country, to be eligible for federal funds for cleanup, a site must be designated a "national priority." To make sure that the program had the necessary momentum, Congress required that EPA identify at least 400 sites for inclusion on the National Priorities List (NPL) at the start of the program. In September 1983, 406 sites were declared "final" NPL sites and eligible for federally funded cleanups, including many of the most notorious sites in the country—Love Canal, Times Beach, and Tar Creek among them.

When the Superfund program first began, most thought there were a limited number of contaminated sites across the country and that the \$1.6 billion trust fund would be adequate to do the job. Little did we know that by 1990, EPA would have listed more than 1,200 NPL sites and that some of these sites would cost hundreds of millions of dollars to clean up and decades to address. In retrospect, EPA was unprepared to deal with the huge number of sites listed in the early years of the program, and many of these sites stagnated, leading to increasing frustration on the part of those living near them. Some of the cleanups at these sites are still not completed today.

The figure on page 21 shows the number of sites listed on the NPL since the inception of the program. Almost 80 percent of all sites were added to the NPL in the first 10 years, between 1980 and 1990. In the 15 years since then, EPA listed

an average of 22 sites a year. Since the first round of sites was listed in 1983, 1,547 sites have been added to the NPL. Federal facilities—sites owned and operated by federal agencies, such as the Departments of Energy, Defense, and Interior—account for 172 of these, or just over 10 percent. Funds for cleanup of federal facility sites come from the individual agencies, not out of Superfund monies. Today, there are 1,239 sites on the NPL, as 308 sites have been deleted because EPA has determined that no further response is required to protect human health and the environment.

When Congress reauthorized the law in 1986, it quintupled the program’s appropriations to \$1.6 billion annually, and added a second tax—the corporate environmental tax—to raise increased revenues. For the past 25 years, more than \$28 billion has been appropriated to EPA to pay for the day-to-day operations of the program as well as the government-financed portion of site studies and cleanups. Authorization for both taxes expired at the end of 1995. For the last two years, 100 percent of Superfund appropriations have come from general revenue because the trust fund is empty.

For most of the program’s recent history, EPA has paid for approximately 30 percent of site cleanups, and responsible parties have paid for the remaining 70 percent of cleanup actions. However, no one actually knows the total amount of money paid to clean up NPL sites, because responsible parties, which pay for the lion’s share of these efforts, do not publicly disclose their costs. This is huge and important gap

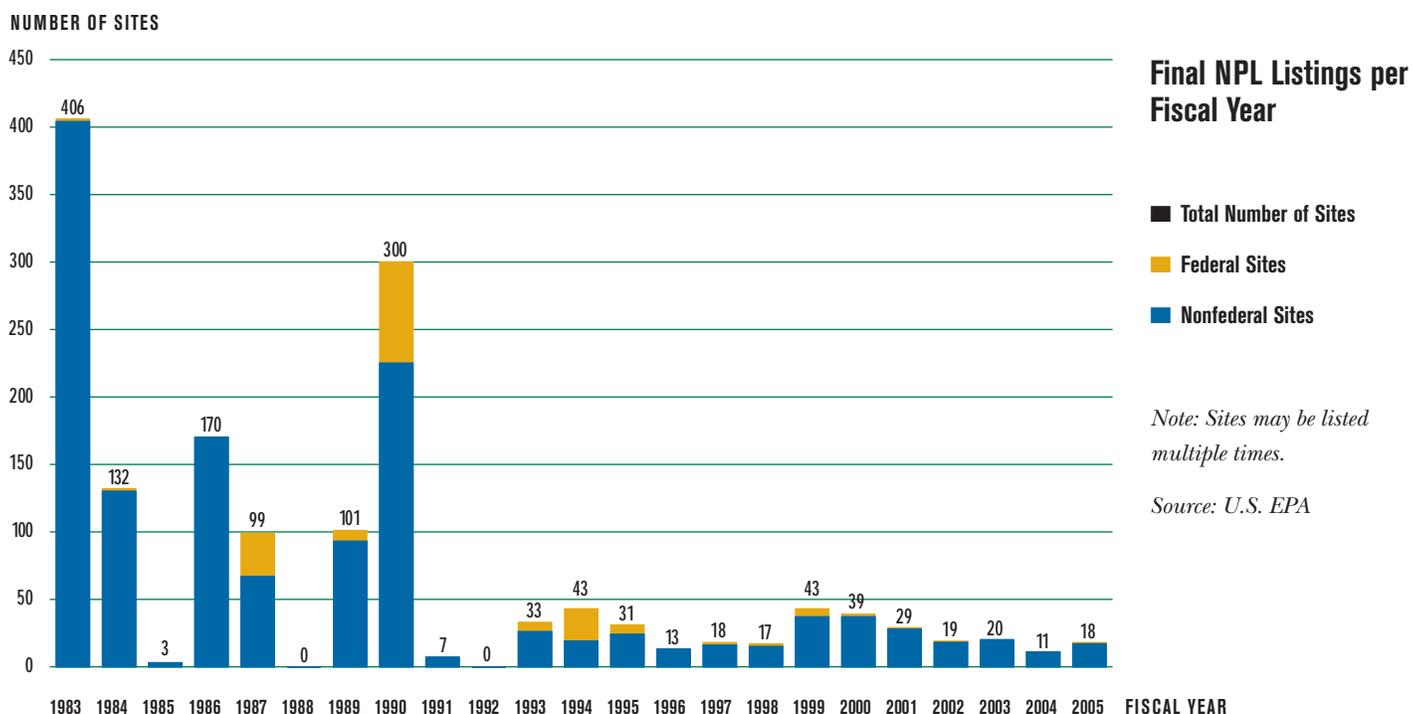
in any attempt to tote up the costs of the Superfund program.

Since 1987, Superfund’s annual appropriations have fluctuated from a low of \$1.1 billion to a high of \$1.6 billion, as shown in the figure on page 22. In recent years, EPA Superfund appropriations have been relatively constant at just under \$1.3 billion a year, at least in what are referred to as “nominal dollars.” In constant 1987 dollars, however, the Superfund’s program spending power has decreased substantially since 1987, as also shown in the figure on page 22. The program’s FY 2005 appropriations of \$1.2 billion are the equivalent of \$820 million in constant 1987 dollars—a 40 percent decrease in purchasing power when compared with actual FY 1987 appropriations of \$1.4 billion.

For the past several years, it has been clearly documented that the Superfund program has a funding shortfall, and EPA has had to delay cleanup actions that are ready to go as a result. In fact, in the past two years, the administration has asked for an additional \$150 million targeted specifically for cleanup actions at NPL sites, which is likely the minimum shortfall, not the maximum.

Listing Sites, More Art than Science

To some, the fact that Superfund is short of money and EPA continues to list sites is an unwelcome surprise. After 25 years, the logic goes, we should be finishing up the sites already on the NPL, and fewer sites should be coming down



Superfund Appropriations

■ Nominal Dollars
■ Constant 1987 Dollars

Source: U.S. EPA



the pike. This sounds good in theory, but, as in many things, the truth is more complicated.

Of the 1,239 sites currently on the NPL, there are approximately 280 where cleanup activities are not completed. In addition, for many of those 960+ sites where the engineering components of the remedy are fully implemented, it will be years before cleanup standards are met. The question of why so many sites are not yet “done” is one that has plagued the program for years. Multiple explanations certainly exist: at some sites, funding shortfalls have delayed cleanups; at other sites, the remedy that was originally selected needed to be revised; and at still other sites, responsible parties are moving more slowly than anticipated. And, of course, at some of the largest and most complex sites, it may just take literally decades to complete the task at hand. That is cold comfort indeed to those living and working near these sites who were promised cleanup years ago.

The process of listing sites on the NPL is more an art than a science. While there is guidance in the law, whether to list a site on the NPL is at EPA’s discretion. It is a tough balancing act to make sure that sites needing federal funds or federal enforcement muscle are listed, while ensuring that there are, in fact, adequate resources to respond. EPA found in the early years of the program that listing hundreds of sites on the NPL and then not acting on them because the

lack of staff and funding undermined the credibility of the program.

Superfund’s liability provisions, as well as the regulations governing the management and disposal of hazardous waste under the Resource, Conservation, and Recovery Act, have almost certainly led to better management of hazardous substances, thereby decreasing the creation of new NPL sites. Still, plenty of “old” contaminated sites exist that need federal attention. The seven sites added to the NPL in September 2005 fall in both the “old” and “new” categories, including a former hard rock mine in Colorado dating back to 1874, a contaminated groundwater plume in Georgia where contamination was first detected in 1996, and a North Carolina electroplating and metal finishing facility that began operating in 1974.

Coming Clean about What Lies Ahead

What should we look for as we think about the next 25 years of Superfund?

The most important element for the future is more transparency in the program. How can this be accomplished?

First, EPA should come clean about the likely pace of cleanup and funding shortfalls. We should not have to rely on reports from the EPA Office of the Inspector General or

the U.S. Government Accountability Office to obtain information on which cleanups are on hold due to lack of funds and how much additional funding is needed. This information should come directly from EPA and it should be credible. EPA should ask for the funds it needs to implement cleanups and, if there is a shortfall, EPA should be clear about the implications.

EPA should continue to improve the information it provides about contamination, and health and environmental concerns at individual sites. There has been some improvement in recent years—but not enough. A critical component of assuring future protection is making sure that governments, private businesses, and private citizens know about any and all restrictions on the use of land, water, and groundwater that are needed to ensure protection.

In this era of ever-scarcer federal dollars, the Superfund program also must take a hard look at its own budget, identify areas that are not very productive, and reprogram funds wherever possible to activities that are directly related to cleanup. This does not mean cutting the enforcement program, but it does mean examining the myriad initiatives that have sprouted over the years to assess which ones are truly worthwhile. These include everything from efforts to focus on redevelopment of Superfund sites to efforts to stimulate new technologies for cleanup. While almost all the initiatives sound good, it is critical that their benefits and costs be evaluated to make sure that the best use is being made of scarce Superfund dollars.

Finally, the Superfund program—like many federal programs—needs to do a better job of self-evaluation. The goal of program evaluation should be to improve implementation in the future and to assure that funds are being spent in the most efficient and cost-effective fashion. With Superfund, everyone has an anecdote about what works, what doesn't, and what the benefits and costs are. All of these elements need to be part of a broader, credible assessment of the program's accomplishments—not simply as a "communications" initiative.

We ought to know, for example, why some sites are taking so long to clean up, and why this is just as true at sites where responsible parties have the lead as at EPA-funded sites. We ought to know what it will cost to finish cleanup at all the current sites on the NPL. We ought to know whether human exposure is under control at 100 percent of NPL sites, not at 88 percent. And we ought to know—and be willing to tell people—which sites are taking longer to address and why. This does not seem too much to ask of a program begun a quarter of a century ago to address the nation's worst sites contaminated with hazardous substances. ■

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Public Use and Just Compensation: How and When Does Economic Analysis Apply?

Timothy J. Brennan

Few recent Supreme Court decisions have inspired heated controversy like that of *Susette Kelo, et al., Petitioners v. City of New London, Connecticut, et al.*, decided on June 23 of this year. The case concerned New London's plan to revitalize a section of the city through a development program that required the "taking" of private homes under eminent domain (that is, without the owners' consent). The homeowners argued, unsuccessfully, that the development plan was not a constitutionally acceptable public use. One cannot rule out the possibility that litigating over public use was merely a ruse by the plaintiffs to obtain more money from the city; however, features of the case suggest that monetary compensation—in the sense that the homeowners were as well off after losing their homes as before—may have been impossible.

Although economics, in the form of cost-benefit analysis, works when policies affect the risk of noncompensable losses, it breaks down when policies are certain to impose such losses on people. Takings that result in this kind of loss may be permissible but require hard and direct ethical balancing far beyond monetary accounting.

Case and Ruling

In January 1998, New London and the state of Connecticut authorized a bond issue to create a park in the city's Fort Trumbull area. Almost immediately thereafter, the pharmaceutical company Pfizer announced plans to build a \$300 million facility on an adjacent site. New London initiated a process, culminating in May 2000, to come up with an economic development plan on 90 adjacent acres. The development plan included a waterfront "urban village" with offices, shops, residences, and a marina.

Unfortunately, the land also included a number of private residences, which New London condemned in November 2000 so it could implement its development plan. None of the properties was blighted. Homeowners—including Susette Kelo (who had devoted herself to extensively renovating her water-view home) and Wilhelmina Dery (who had lived in the same house since her birth in 1918, including six decades with her husband)—petitioned to halt the seizure. They argued that the plan was not a constitutionally acceptable public use according to the Takings Clause of the Fifth Amendment, which states, "... nor shall private property be taken for public use, without just compensation."

The Supreme Court justices all agreed that, even with just compensation, transferring property from one private party to another under eminent domain is not permissible under the Constitution. They also agreed that the government can take land for government functions, such as military bases, or for uses accessible to the general public, like railroads. However, *Kelo* concerned a middle ground, where facilities created through economic development (in this case, a marina and office complex) were not accessible for general use.

Justice John Paul Stevens wrote for the slim 5-to-4 majority that the term "public use" has evolved to mean "public purpose," which, in turn, is left to the relevant public authority to decide. Economic development is a longstanding public function and is not made objectionable by the fact that specific individuals benefit, he argued. Concurring, Justice Anthony

Kennedy added that some takings “might justify a more demanding standard” when favoritism of particular private parties is suspected.

In a scathing dissent, Justice Sandra Day O’Connor stated that under the majority’s opinion, “the specter of condemnation hangs over all property. Nothing is to prevent the State from replacing any Motel 6 with a Ritz-Carlton, any home with a shopping mall, or any farm with a factory” and that the majority’s deference to local government makes the public use clause nothing more than “hortatory fluff.” Only a “stupid staff[er]” could fail to gin up a public purpose justification for any taking, because most property has some imaginable “more productive or attractive possible use.” Those lacking the political wherewithal to influence local governments are most vulnerable to having their property taken.

Within a week, the House of Representatives passed a nonbinding resolution disagreeing with the majority, reserving its right to address “abuse of eminent domain” if executed by state and local governments for purposes that do not “serve the public good.” Agreeing with Justice O’Connor, Congress noted that the *Kelo* decision would put poor, minority, and elderly constituents at disproportionate risk. Both houses introduced bills to prevent the federal government from exercising eminent domain for economic development and to deny federal funds to state and local governments that did, and several state governments passed laws preventing takings like New London’s.

With respect to land use, habitat preservation, and other regulatory policies, economists have extensively examined when and how much compensation should be provided to private property owners in government takings. Some economic analyses suggest that government should pay for seized property to bear the costs of its actions (not only the direct loss to the property owner but also people’s reduced incentive to produce and trade if they believe that the government can arbitrarily take their property). However, the government is an actor directed by its constituents, including property owners, and so should already be taking the property owners’ interests into account. However, other analyses recognize that different constituent groups have different levels of influence and that opposition to otherwise efficient policies may be defused by compensating politically powerful groups.

The crux of the *Kelo* case was not compensation per se but the kinds of use under which government takings are constitutionally permissible. Although purely private transfers are not allowable, economic principles alone do not rule them out. Sometimes the benefits to the winner exceed the costs to the loser. However, government is not needed for such transfers; transactions in which benefits exceed costs are already possible through voluntary exchange. In addition, government-engineered transfers suffer from both inadequate information (the government cannot know that one person values something more than someone else does) and undue political influence (a party may be able to get the government to take property on its behalf, no matter what its value to the original owner).

For a taking to be justified on economic grounds, market exchange must somehow “fail,” but public use is neither a sufficient nor necessary condition for the failure. It is insufficient in that government cannot take property for its own purposes without the owner’s consent. When the government wants to procure equipment, lease office space, or hire workers, it normally is required to do so through the market. In and of itself, public use also is not necessary. The leading criterion for market failure in land use is the need for the simultaneous consent of many landowners. Building a highway requires obtaining land along a continuous path, and any landowner holdouts along the way could scuttle the project. Even if the value of the road exceeds the prior value of the land, negotiation may not succeed, because

Why Compensate? Why Take?

each landowner has an incentive to hold out for an inordinately high price.

The “many landowners” problem may affect not only government infrastructure (roads, parks, and military bases) but also large-scale, essentially private enterprises (railroads, pipelines, and sports stadiums). It may even be relevant to large multifunction enterprises, such as the waterfront complex envisioned by the New London Development Corporation. Even if the market fails for public or private uses, eminent domain could be erroneously applied or politically abused. In focusing exclusively on public use and neglecting potential market failure, the Supreme Court’s decision illustrated the limits to which economics can and perhaps should affect constitutional interpretation.

Is Compensation the Real Issue?

Given the weakness of the link between public use and the market failure to justify eminent domain, it could be argued that the petitioners’ focus on public use was but an indirect attempt to increase their compensation. Property owners would be expected to attempt to maximize their compensation, and New London may have wanted to pay owners below market value. However, even market value may not compensate for an incurred loss. A person typically buys something because it is worth more to him or her than the actual money paid.

Accordingly, an economist defines compensation not by market value but by whether it makes the original property owners just as well off after the taking as before: can they purchase similar homes with compensation received and be just as happy as in the old homes? Exactly what constitutes “just as well off” is determined by each property owner—not the government, a court, or another outside party. If an owner has a strong emotional attachment to the property, then market value may never be enough compensation for its taking, and more money may not be the solution.

The *Kelo* case raises the possibility that no monetary award could compensate these residents for the taking of their homes. Noncompensable losses are not unheard of; for example, no amount of money can bring a person back from the dead. Although many people would

How to Calculate Incalculable Losses

Imagine a group of people who can choose between two jobs: one in an office or one on a construction site. Working on the construction site entails a small added risk—say, a 1-in-100,000 chance of fatality in any given week. That small risk excluded, people would be willing to work either job if salaries were the same.

Because the construction job is slightly less desirable because of the added risk, it must pay more to attract workers. If people are unwilling to take risks at all, then no wage will be high enough to convince someone to take

the construction job. But if a study of the labor market reveals that the construction job is filled when it is offered at \$50/week more than the office job, one could infer that people who apply for the construction job would pay at most \$50 to avoid a 1-in-100,000 chance of a fatality. If 100,000 people made this choice, each willing to pay no more than \$50 to avoid the marginally more risky job, then one could say that collectively, the construction workers would pay no more than \$5 million ($100,000 \times \50) to avoid one expected fatality ($100,000 \times 1/100,000$ chance).

That \$5 million value is known as the statistical value of life (SVOL) in cost-benefit studies. A policy that would give

people a similar risk reduction but at a cost of more than \$5 million—say, \$10 million—would give them a \$50 benefit worth less than the \$100 per-person cost. Recent studies find SVOLs in the range of \$5 million to \$7 million.

Although risk estimation is fraught with severe difficulties in measurement and interpretation, the overall principle remains: if people are willing to spend only a finite amount to reduce the risks of losses beyond compensation, then a finite SVOL value can and should be used to determine whether the costs of a policy are worth incurring.

happily accept market value for their properties—especially if they could sell high—the petitioners in *Kelo* may have believed that no amount of money could compensate them for the losses of their homes.

Cost–benefit analyses assign monetary values to gains and losses to establish the theoretical possibility that the parties who gain from a policy (in the *Kelo* case, beneficiaries of New London’s development) could compensate the parties who lose (in this case, the homeowner petitioners). Such techniques are an important part of environmental policy, even when the policy’s effects include life-or-death matters, such as exposure to toxic pollutants. Does the *Kelo* decision indicate that cost–benefit analysis can never be applied when losses are beyond monetary compensation?

Monetary benefits can be assigned to loss prevention not because all losses can be reduced to money values but because people typically sacrifice only finite amounts to reduce the chance of suffering such losses—even noncompensable ones (see sidebar, *How to Calculate Incalculable Losses* on page 26). For example, most people have limits on how much they are willing to spend on cars that offer multiple air bag protection. Some people accept the physical risk associated with a certain job because of an associated pay premium. And although I have no way of knowing, I would be surprised if Ms. Kelo and Ms. Dery never lit candles or used a fireplace or if they had installed automatic sprinkler systems to limit the risk of destruction of their irreplaceable homes.

If a policy costs more to reduce risk than the beneficiaries themselves pay for such reductions, then the benefit is worth less than the expense. The beneficiaries would be better off with the money, and, from an economic perspective, the reduction in risk is not worth reducing. Moreover, nothing is logically inconsistent about an unwillingness to spend unlimited amounts to reduce risk, even when the loss itself is noncompensable. (Some people may find it irrational to refuse a huge sum of money in exchange for a property, but in economics, “rationality” refers only to logical consistency—not wisdom.) Beyond a certain level of compensation, the value diminishes; more money will never increase well-being enough to compensate for the loss.

Monetary cost–benefit analysis breaks down as we move from policies with small effects on the chance a noncompensable loss might occur to policies that are certain to cause losses. The parties who gain from a policy would not be unable to compensate the parties who lose. But the inapplicability of cost–benefit analysis does not mean that property should never be taken. Instead, conceptions of the public interest that extend beyond money (for example, increasing aggregate well-being or protecting moral rights) are needed to justify such policies.

Consequently, the public use clause of the Fifth Amendment may reflect the need to recognize nonmonetary ethical norms when property is taken by the government. The clause does not address how to sort out efficient and inefficient interventions, but it can help ensure that the public sector restricts takings to settings in which the social values promoted are of sufficient moral import to justify inflicting harm on parties who could never fully recover. Economics cannot substitute for ethics when losses cannot be calculated in dollars and sense. ■

The complete text of the *Kelo* decision is available at www.supremecourtus.gov/opinions/04pdf/04-108.pdf.

Balancing Interests for Noncompensable Losses

Public Use and Limits on Economics

Matthew Simmons, Energy Investment Banker, Joins RFF Board

With gas prices still lingering at about \$2.50 per gallon and home heating costs expected to soar this winter, politicians are running out of quick fixes and urging citizens to conserve. Energy industry investment banker Matthew R. Simmons says long-term solutions will be much harder to find. He warns that the era of “peak oil” is over: world oil output is starting to decline, regardless of Saudi Arabia’s claims to the contrary.

Simmons, who recently joined the RFF Board of Directors, is the chairman of Simmons and Company International, a Houston-based investment bank serving the oil industry for more than 30 years. In his new book, *Twilight in the Desert: The Coming Saudi Oil Shock and the World Economy* (John Wiley & Sons, 2005), he asserts that the lack of easily verifiable, publicly available data about the strength of the Saudi oil reserves has allowed for wildly inflated projections and helped to distort the true picture of where the world stands in terms of proven energy resources.

Various energy crises have been in play in recent months, such as the debate over whether to open the Arctic National Wildlife Refuge for drilling, but for Simmons, real solutions will only come when we take energy issues out of the partisan arena. “Today’s problems arise from 50 years of en-

ergy mistakes—covering 10 administrations and 25 congresses. We all share in our current energy data hole.”

According to Simmons, RFF can play an important role in helping to create better frameworks to analyze the energy intensity of new energy sources, such as Canadian shale oil, as well as the practical time it will take to introduce many “pet energy solutions, like raising the CAFE standards.”

(This fall, Simmons gave a presentation as part of RFF’s Energy 2050 series on his work; see related story on page 14.)

Different definitions of scarcity

Many economists, both at RFF and elsewhere, have long questioned the concept of whether resource scarcity and exhaustion is useful or relevant to energy policy. For their part, they stress the corrective capacity of markets and point to the historic record of technological progress. But Simmons is quick to disabuse policymakers of such assertions.

“It never ceases to amaze me how often and how passionately I hear these views stated,” Simmons said. “I know what oilfield technology did

and how long it took to invent and commercialize. It has been hyped as replacing the need to drill and steadily reducing the cost to drill and complete wells.”

For Simmons, it’s a matter of basic arithmetic. By significantly reducing the number of appraisal wells drilled and rarely coring them, it was easy for Saudi Arabia to grossly overstate proven reserves, he said. The cost to drill and complete wells has doubled and the last major oilfields were founded 20 to 40 years ago.

The price of oil could double or increase four-fold, but this would not generate more supply, Simmons said, nor would it address a chronic rig shortage, a lack of refineries, or an inventory of feasible, new projects.

Moving beyond our carbon-intensive status quo

Real, lasting change will only come when we recognize that we are, in effect, on war-time footing, Simmons said, calling for the energy equivalent of the U.S. Marshall Plan, which led to the reconstruction of Europe following World War II.

“We first need to reform global energy data and begin an era in which



MATTHEW SIMMONS

all reliable oil and gas suppliers provide mandatory, field-by-field quarterly production reports and data on the number of producing well bores that create their supply,” Simmons said. Conclusions from the data could form the basis for a global framework for significantly reducing gas and oil energy intensity.

Simmons is a graduate of Harvard Business School and served as an energy policy adviser to the 2000 Bush-Cheney campaign. ■

RFF Board Elects Michael Bean, Environmental Lawyer

At the beginning of his career 30 years ago, Michael Bean encountered the pioneering research of John V. Krutilla, one of RFF's founders. "I was impressed with his work in integrating wildlife into economic valuation systems and how that could advance conservation goals."

That seed bore fruit. Bean, recently named to the RFF Board of Directors, has become a leader in designing economic incentive programs to complement regulatory tools for wildlife conservation. Today, as a senior attorney at Environmental Defense—a national environmental group known for its tough litigation—he promotes collaborative alternatives to courtroom confrontations.

Economic incentives aimed at private landowners, he believes, can encourage them to engage in active management for the benefit of endangered species. He considers the Endangered Species Act largely successful in ensuring that the activities of federal agencies don't cause further harm but less effective in its impact on privately held lands. "The task at the moment," he says, "is to design carrots and enlist private landowners as partners."

One such carrot is the Safe Harbor Agreement, which Bean helped develop with the U.S. Fish and Wildlife Service. It protects landowners from future regulatory restrictions in ex-

change for voluntary management for listed species. The program was initiated to manage habitat for the red-cockaded woodpecker while allowing private and commercial use of resources.

Another promising incentive that Bean championed is "conservation banking," which provides opportunities for landowners to earn credits for investing in conservation activities on their own land, then realize financial gain by selling their credits to other landowners who need to compensate for the environmental impacts of development. Under a Fish and Wildlife Service program, ranches, farms, and timberland can now function as conservation banks if the land is managed as habitat for listed and at-risk species. The idea is to turn endangered species into assets for landowners, rather than liabilities, says Bean.

At Environmental Defense, Bean is chair of the wildlife program and co-director of the Center for Conserva-



MICHAEL BEAN

tion Incentives, which designs and implements model projects employing incentive-based strategies. The center also seeks to make federal and state incentive policies more effective in both protecting ecosystems and rewarding landowners, and build

public awareness and support for incentive-based stewardship programs on private land.

Bean is the lead author of *The Evolution of National Wildlife Law* (Praeger, 1997), a comprehensive analysis of federal wildlife conservation law, now in its third edition. He earned his law degree from Yale and was an editor of the school's law journal. Before joining Environmental Defense, he worked for a corporate law firm.

Bean says he is "flattered" to have been invited to join the RFF board. He calls the organization "consummately professional and innovative, with a staff of highest quality." ■

RFF Scholar Fills Darius Gaskins Chair

This October, Karen L. Palmer was named Darius Gaskins Senior Fellow. In this capacity, she will continue more than 15 years of research at RFF on electricity and the environment.

Darius Gaskins, currently a partner at Norbridge, Inc., was inspired by his long association with RFF to endow the chair. An RFF Board member from 1990 to 2002, Gaskins first be-

came familiar with what he calls RFF's "creative intellectual capital" as a Department of the Interior official in the



KAREN L. PALMER

early 1970s. At the time, he says, "it was accepted wisdom among the resource economists that RFF was the font of seminal work" on commodity and natural resource issues. Gaskins created the chair to provide continuity for such work. ■

Spotlight on New Scholars

This September, RFF welcomed four new staff members, whose interests range from uncertainty analysis to sustainable community development. *Resources* talked with each of them about their backgrounds and goals.

Joseph Aldy joined RFF as a fellow in its Energy and Natural Resources Division, on the heels of completing his Ph.D. in economics from Harvard University.

Growing up on his family's farm in Lexington, Kentucky, Aldy developed a strong interest in environmental issues early on. He studied deforestation and climate change in high school and later earned a B.A. in water resources and a Masters of Environmental Management at Duke University.

"Entering this field was very natural for me," says Aldy. "It combines what I learned from a childhood spent outdoors with the intellectual reward of studying challenging and urgent environmental issues."

With the goal of contributing to environmental policymaking, Aldy began his career as a Presidential Management Intern at the USDA Economic Research Service in 1996. From 1997 to 2000, he served on the staff to the President's Council of Economic Advisers, where he focused on a wide array of issues, including climate change policy, air quality regulations,

petroleum markets, electricity restructuring, hazardous waste policy, environmental issues in China, and sustainable development.

At RFF, Aldy will examine questions about climate change policy, mortality risk valuation, energy subsidies to low-income households, and energy policy. In particular, Aldy is studying the relationship between economic development and greenhouse gas emissions, which can inform his work on the design of international climate change policy architectures. His work on mortality risk valuation assesses how individuals value mortality risk reductions over their life cycle.

Aldy will also continue research on the effects of heating subsidies to low-income households on mortality among the elderly, a topic he addressed in the lead essay of his Ph.D. dissertation. "In light of the expected high natural gas and heating oil prices this winter," Aldy notes, "heating subsidies can help the elderly and those in poor health mitigate their exposure to cold weather and reduce their cold-weather mortality risk."

Roger Cooke is the first appointee to RFF's new Chauncey Starr Chair in Risk Analysis. He is recognized as one of the world's leading authorities on mathematical modeling of risk and uncertainty, and his research has widely influenced risk assessment methodology, particularly in the areas of expert judgment and uncertainty analysis.

As the Starr Senior Fellow, Cooke will examine structured expert judgment methodologies and uncertainty analysis, as well as the implementation of uncertainty analysis in policy-related decisionmaking.

Prior to joining RFF, Cooke was professor of applied decision theory at the Department of Mathematics at

Delft University of Technology in The Netherlands, where he served for more than 25 years. While there, he launched a risk and environmental modeling master's program.

He has also served as a consultant to the Japanese government on disposal of abandoned World War II chemical weapons in China and the Swedish Nuclear Inspectorate on piping reliability in nuclear power plants, among others.

Cooke earned his Ph.D. from Yale University, where he studied philosophy and mathematics. His recent research has encompassed health risks from oil fires in Kuwait following the first Gulf War, chemical weapons disposal, nuclear risk, nitrogen oxide emissions, and microbiological risk.

The Starr Chair was created for a senior scholar whose work significantly advances the way society understands and manages a variety of risks to human health and the environment. "The establishment of a chair in risk analysis at RFF represents a significant milestone for me," says benefactor Chauncey Starr, a pioneer in the field. "RFF is one of the few institutions capable of having a lasting influence on government policymakers about the importance of risk analysis."

Shalini Vajjhala joined RFF as a fellow in the Risk, Resource, and Environmental Management division, where she studies development and environmental projects with a public participation component, such as siting electric power lines. Because her interests lie at the interface between large-scale technical projects and grassroots decisionmaking, her research brings together the fields of development planning, risk communication, spatial analysis, natural resource management, and judgment and decisionmaking.



From left: Joseph Aldy, Roger Cooke, Shalini Vajjhala, and Robert J. Weiner.

As a doctoral student at Carnegie Mellon, Vajjhala worked on a series of projects in which she combined hand-drawn community maps with state-of-the-art geographic information systems (GIS) tools to study how personalized maps can facilitate risk-related decisionmaking and communication. She plans to extend this research in her new position at RFF.

She first developed the project in response to the difficult task of communicating risks and incorporating local knowledge into large development-induced resettlement projects. “How do you communicate with diverse groups of people who will be resettled to areas they’ve never seen before?” Vajjhala asks. “The planning for these projects and the risks people face are inherently based on spatial information, so I thought, ‘Why not maps?’”

Her work has taken her all over the globe, from India, where she studied resettlement issues, to Pittsburgh, where she aided community-planning efforts in low-income neighborhoods, to Lesotho, where she mapped mobility and access patterns of isolated villagers.

“We asked villagers to develop maps of how they moved about and what obstacles they encountered to accessing basic services,” Vajjhala says. In combination with a national GIS system, the hand-drawn maps allowed

local planners to make informed choices about where to build transportation infrastructures and to assess their social impacts.

Vajjhala holds a Ph.D. in Engineering and Public Policy. Prior to joining RFF, she taught design courses in Pittsburgh and worked as an architect and community organizer focused on sustainable community development.

RFF also welcomes **Robert J. Weiner** as the 2005–2006 Gilbert F. White Fellow. In this capacity, Weiner will focus on understanding why oil prices are so high and so volatile, examining the role of speculators and speculation in oil trading.

“The trade press, popular press, and many organizations, OPEC included, are blaming speculators for high oil prices, but this stance is based largely anecdotal evidence, convenience, and ideology—not careful analysis,” Weiner says. “I was attracted to RFF by its pioneering research on the behavior of oil markets and oil prices during crises.”

Such work is once again on the front-burner of policy issues: while economic research finds that markets work well on average, policymakers focus more on market functioning during crises.

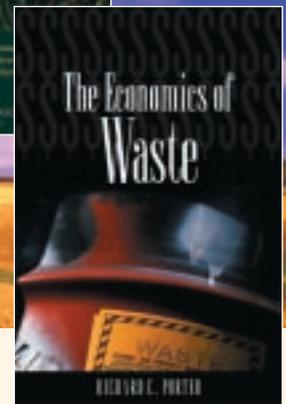
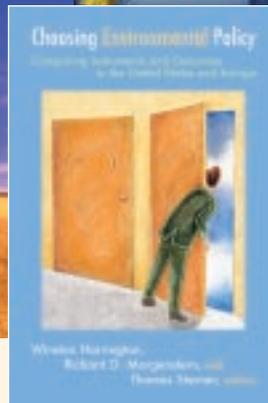
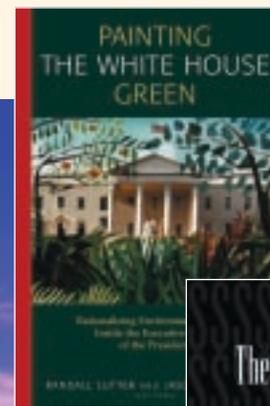
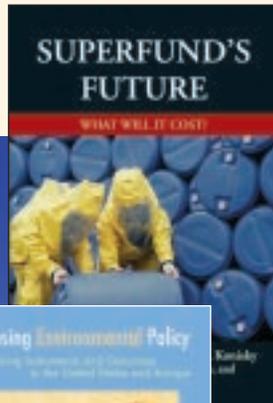
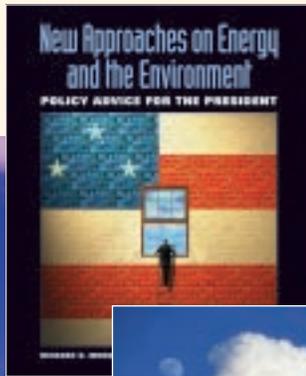
Weiner comes to RFF from George Washington University, where he is professor of international business

and international affairs at the School of Business and Public Management. He concurrently serves as Membre Associé, GREEN (Groupe de Recherche en Économie de l’Énergie et des Ressources Naturelles), Département d’économique, Université Laval, Québec.

Weiner has also taught at Harvard University, Brandeis University, Johns Hopkins University School of Advanced International Studies, and the Royal Complutense University (Spain). He has taught courses on finance, international business, industrial organization, and environmental and natural-resource economics. From 2001 to 2005, he was chairman of the Department of International Business at George Washington University.

Weiner received his Bachelor’s degree in Applied Mathematics and Master’s and Doctoral degrees in Business Economics, all from Harvard University. He has authored or coauthored four books and numerous articles on contracting, risk management, and the oil and gas industry. His research interests and projects have focused on a wide range of issues, including oil and gas trading, derivative markets and privatization, and the behavior of state-owned enterprises in the world petroleum market. ■

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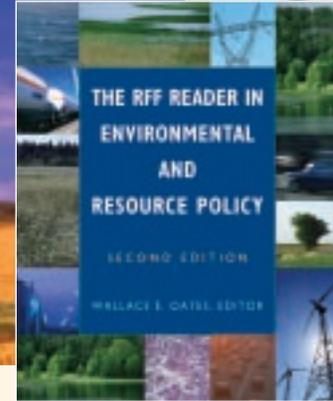
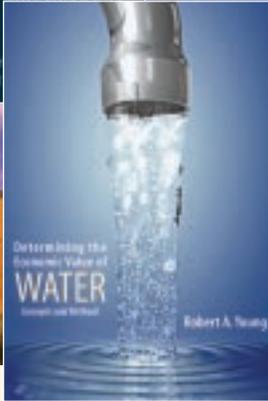
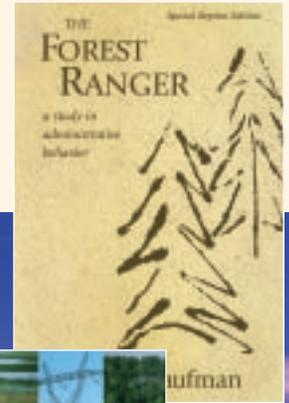
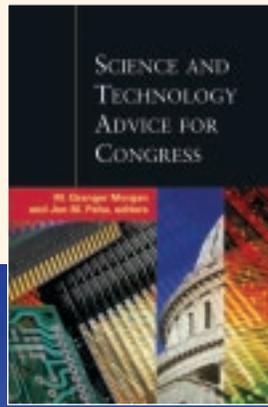
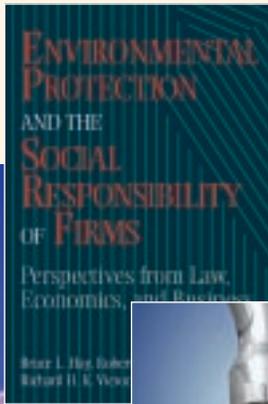
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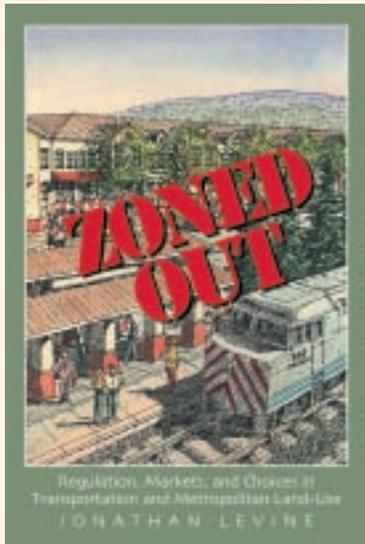


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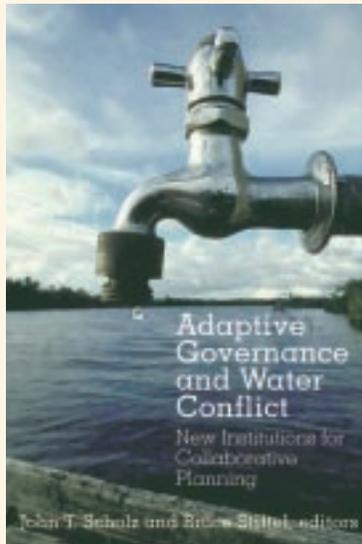
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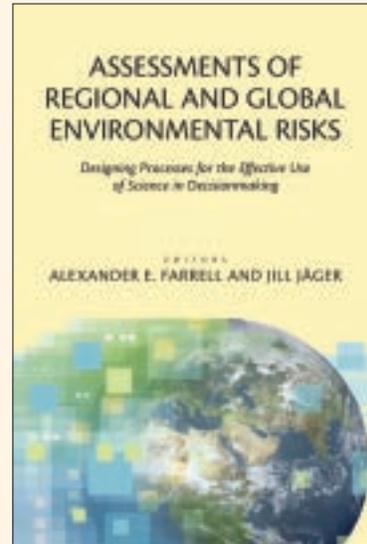
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