



PLAYING THE MARKET

Using Competition to Get Others to Practice What We Preach

The inventor Paul MacCready once likened Rocky Mountain Institute's Amory Lovins to a grain of sand in an oyster—the irritating catalyst that causes pearls to form.

That's not a bad metaphor for the way RMI operates. Free and fair markets often produce the best pearls; they just need a little sand to get them started. By putting the right information into the right hands at the right time, the Institute stimulates technologies and techniques that work better and cost less. That those pearls also happen to benefit the environment need not concern the oysters.

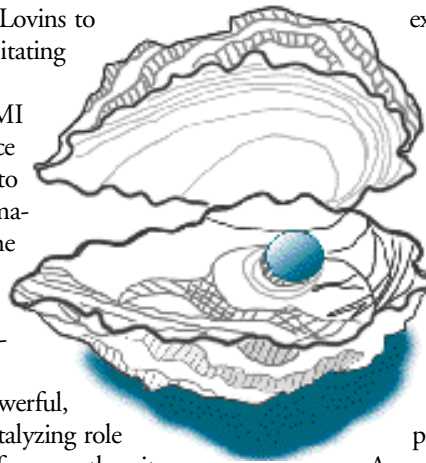
Effectively harnessed, competition is a powerful, dynamic force for change. By playing this catalyzing role within the private sector, RMI accomplishes far more than it ever could through conventional policy advocacy (or litigation) in the public sector.

Lately, RMI has been applying its catalytic powers to particularly good effect in the fields of automotive design and real-estate development, not only implanting revolutionary ideas but also nurturing them with the right market-making nutrients. Here's how:

EARLY ADOPTERS

RMI has always focused its efforts on "early adopters"—corporations and individuals that readily embrace new ideas and in turn introduce them to a wider audience. Key to this strategy, however, is that early adopters must see the prospect of being richly rewarded for acting first. Every early adopter's nightmare is blazing a costly and risky trail, only to be overtaken by late-blooming laggards.

The hypercar, which RMI has been instrumental in promoting for the past five years, is a case in point. Lovins predicts it will bring about the most radical industrial transformation since the microchip. If that's so, a savvy early adopter has a shot at becoming another Intel or Microsoft—and established carmakers will have to move just as fast if they hope to retain market share.



Lovins and other RMI staff have given countless executive briefings and presentations and written more than a dozen papers to demonstrate not only the technical feasibility of hypercars but also the financial rewards awaiting those who bring it to market.

To date, about two dozen auto- and parts-makers have launched hypercar development programs, collectively committing an estimated \$1 billion. A few, like Swiss-based Esoro, are small design studios or start-ups, free of institutional inertia and unencumbered by huge investments in conventional manufacturing processes. Many are major European and American carmakers, who view hypercar research as a prudent hedge against an uncertain future. Some are aerospace or electronics firms seeking new outlets. RMI supports each company's development efforts on a compartmentalized, non-exclusive basis: it doesn't tell one what the others are doing, but each can be sure that it's not the only one getting RMI's strategic and technical advice.

Meanwhile, RMI's Green Development Services is working with a special group of early adopters within the commercial real-estate industry. Called the Merritt Alliance (LLC), the consortium sees an emerging market opportunity in integrating highly resource-efficient building products—from heating and air-conditioning systems to office furniture—thus offering "lean, clean, and green" offices to major corporations.

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The Newsletter

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LETTERS TO THE EDITOR

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About the Institute

Rocky Mountain Institute is an independent, nonpartisan, nonprofit research and educational foundation with a vision across boundaries.

Seeking ideas that transcend ideology, and harnessing the problem-solving power of free-market economics, our goal is to foster the efficient and sustainable use of resources as a path to global security.

Rocky Mountain Institute believes that people can solve complex problems through collective action and their own common sense, and that understanding interconnections between resource issues can often solve many problems at once.

Founded in 1982, Rocky Mountain Institute is a §501(c)(3)/509(a)(1) public charity (tax-exempt #74-2244146). It has a staff of approximately 40 full-time, 45 total. The Institute focuses its work in seven areas—agriculture, economic renewal, energy, green development, security, transportation, and water—and carries on international outreach and technical-exchange programs. Its E SOURCE subsidiary (1033 Walnut, Boulder, CO 80302-5114, 800/E SOURCE, 303/440-8500, fax -8502) is the leading source of information on advanced techniques for electric efficiency.

PERSPECTIVES

By L. Hunter Lovins, Executive Director

We really can make a difference. That simple truth was reaffirmed for me by a small triumph of common sense this past winter. It's the story of a small community that, confronted by an inappropriate development, came up with a better solution, and in the process discovered itself.

Hawaii Electric Light Co. (popularly known as HELCO) had applied for permission to build two diesel power plants on the Big Island. Their purpose, the utility said, was to meet peak demand, but no thought had been given to managing demand instead. Maybe HELCO simply wasn't familiar with the past two decades' experience of demand-side management on the mainland. Maybe the fact that HELCO's parent company owns the barges that would transport the diesel to the island had something to do with it.

Of course HELCO sited the plants not in the resort areas along the south coast, where the peak demand was coming from, but on the undeveloped north coast, where the local population of 3,000 presumably presented fewer obstacles.

Specifically, the utility chose a site just upwind of two small communities on the North Kohala coast, with the outlet stacks to be level with the houses. As it happens, many people with asthma live in North Kohala, because it's one of the few parts of the Big Island that doesn't suffer from "vog," a sulfuric fog given off by Mauna Kea. For them, HELCO's plants were an assault on their health.

All North Kohala had was its determination and a dedicated local attorney named Greg Ball, who took up the fight on behalf of a group of local asthmatics. Greg, however, had no prior utility experience and the Public Utility Commission denied him "intervenor" status, meaning he couldn't formally represent his clients in the matter. When Greg contacted us in December, things were looking grim.

Even the state's Consumer Advocate was favoring approval.

But Greg and community organizer Midge Eichner had persuaded the PUC to come up to North Kohala and hear first-hand from its citizens. They asked if we could speak. Bill Browning, Robbie Noiles and I were scheduled to be in Hawaii then for a conference anyway, so of course we agreed.

We spoke of the simple efficiency measures that could reduce evening peak loads at less cost to the utility than building new power plants, and dramatically reduce customers' bills at the same time. And we spoke of renewables as a more sensible way to increase supply: North Kohala is rated the



second-best wind site in the world, and the sunny leeward side of the island is ideally suited for photovoltaics.

Shortly after the hearing, the Consumer Advocate came out against the project. In mid-January the PUC, citing the hearing, ordered HELCO not to spend any more money on its North Kohala plan, granted Greg intervenor status, and scheduled a hearing—with RMI—in October.

Now, such battles are rarely won on the first round. Utilities can be slow to learn, and HELCO's proposal may resurface somewhere else on the island.

But for the people of North Kohala, the episode was empowering. Having learned what they don't want, they're now in a position to make positive choices to revitalize their economy. We've plugged Greg into our network, including a company that installs PV power plants—and calculates that it can provide power more cheaply than the diesels.

So if you ever wonder if RMI makes a difference, take a moment and savor this one. For one little community at the end of the road, in the middle of a big ocean, we and the citizens of North Kohala made all the difference in the world. 🌍

RISKY BUSINESS

How to Cool Global Warming? Show Industry What it Stands to Lose

If you've been following the proceedings of recent climate-change conferences, you may have concluded that the world's political leaders are about as likely to act on global warming as the Devil is to don ice skates.

Behind the scenes, however, developments are much more heartening, thanks in particular to the efforts of two friends of Rocky Mountain Institute at Greenpeace and the Natural Resources Defense Council. Their tactics differ from RMI's, but their strategies are strikingly similar: find the right leverage points in the system; harness the power of the marketplace; and appeal to self-interest instead of brandishing litigation or coercion.

Consider the nature of the global climate-change threat. Although most scientists agree that it's real, many powerful interests maintain that the evidence isn't strong enough to warrant action. Yet global warming doesn't have to be a *certainty* to be a *risk*—and some large sectors of the world economy are starting to realize that they're extremely sensitive to such risks.

The insurance and banking industries, for instance. One of the predicted outcomes of climate change is a marked increase in extreme weather such as floods, droughts, wildfires, tornadoes, and hurricanes. Big storms mean big losses for insurers, and uninsured losses often get passed on to banks and other investment institutions such as pension funds, which provide much of the world's debt and equity financing.

The global insurance industry holds reserves for about \$200 billion in catastrophic losses each year, according to Jeremy Leggett, director of Greenpeace International's Solar Initiative. That might sound like plenty, but Leggett warns that two or three big back-to-back disasters could collapse the system. Along America's Eastern Seaboard alone, some \$2 *trillion* worth of real estate is at risk of flooding caused by storms and rising sea

levels associated with global warming. No amount of premium hikes can cover such unpredictable, open-ended risk.

Leggett has spent the past three years patiently putting the known facts about climate change before the global capital markets, primarily by organizing elite seminars where executives can hear impartial threat assessments from scientific authorities. "My experience is that the facts speak volumes," he says.

The insurance, banking, and electricity industries are all realizing that global warming doesn't have to be a certainty to be a risk.

Indeed, the insurance industry—whose business is based on worrying about the future—is arguably set to become the single biggest lever for action on climate change, with influence along three fronts.

First, some of its worried members are goading governments to back their words with deeds. Last April, industry representatives not only attended the Berlin climate-change summit, but actively lobbied political leaders to hurry up and work out a treaty. And in November, forty insurance companies (none of them American) signed a declaration, brokered by the United Nations Environment Program, committing themselves to help reduce the threat of climate change. Top European insurance executives are increasingly seen on the lecture circuit, urging their corporate colleagues to take climatic risks seriously.

Second, insurance companies can help spur energy efficiency and renewables through their own procurement policies.



Banks and other mortgage lenders are in a position to change standard practice by writing requirements for these technologies into their loan contracts.

Finally, and most significantly, insurance companies and their peers in the capital markets can aid the development of alternative technologies through their investment strategies. According to Leggett, the insurance industry collects \$1.4 trillion in premiums each year, much of which is reinvested. If insurers become concerned enough about the climatic risks of burning fossil fuels, they'll start to hedge their bets by investing in non-polluting alternatives. Reallocating even a small portion of their vast portfolios in this way would give renewable (notably solar) technologies the boost they need to become more competitive with fossil fuels.

Leggett and others make a strong case for these steps in *Climate Change and the Financial Sector: The Emerging Threat, the Solar Solution*, published this spring by Gerling Akademie Verlag.

Meanwhile, at the Natural Resources Defense Council, energy program director Ralph Cavanagh is using risk assessment to coax another industry—electric utilities—to come to terms with the implications of its investment choices.

Electric companies are an obvious leverage point because, as Cavanagh points out, they generate 36 percent of U.S. greenhouse gas emissions. Unlike insurance companies, however, they've historically had little incentive to assume responsibility for their contribution to the problem: their climatic costs are, in economists' parlance, external.

In the early '90s, Cavanagh started try-

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SEEING THE FOREST FOR THE TREES

The Systems Group on Forests Looks at the Big Picture

“I think this group shows incredible promise in addressing the real problems, rather than just rehashing the same old ‘solutions.’”
 —Systems Group member Norman Myers

For every problem, H.L. Mencken once said, there is a solution that is short, simple, and wrong. How prophetic of this sound-bite era.

The antithesis of this quick-fixism is systems thinking, which seeks solutions that address causes instead of symptoms, and that don't create new problems or shift problems elsewhere.

The Systems Group on Forests, which RMI helped create (Summer 1995 *Newsletter*), met in December at RMI to start doing just that. The world-class experts stepped back from mere “deforestation” and looked at the proverbial Big Picture: not “How can we stop companies from cutting down so many trees?” but “What interventions in the global forestry system would give all parties sufficient incentives to use forests sustainably?”

Granted, the second question isn't as catchy. Yet by tracing the problem back to its roots, the group started laying the groundwork for actions that stand a real chance of working, because all parties will benefit by pursuing them.

“I think this group shows incredible promise in addressing the real problems, rather than just rehashing the same old ‘solutions,’” commented Norman Myers, a noted researcher, author, and consultant on the environment and development. In his 25 years of participating in forest-related meetings, he said, this was the first time he had heard a discussion of the *root causes* of deforestation and inappropriate resource use.

Aiming to draft recommendations later this year, participants chose these main initiatives:

- **Efficiency and substitution.** RMI's approach to resource issues is to shift the emphasis from increasing supply to enhancing resource productivity, letting profits motivate efficiency. Big economic opportunities await those who can figure out attractive ways to use wood more efficiently, develop substitutes for wood, or satisfy in other ways the end uses currently met by wood. The Systems Group will prepare a compendium of innovative products and practices to help make markets in “negalogs,” and will try to scope the combined potential for all kinds of savings that could help protect natural forests.
- **Follow the money.** Forestry is often conducted unsustainably because, as with most other extracted commodities, global markets reward

logging companies and other “downstream” actors far more handsomely than they do owners or residents of the forests. To address these inequities, the group will create a rigorous analytic model for one or two commodities, tracking capital flows, value chains, and environmental impacts. The model should help reveal the underlying causes of unsustainability and hidden leverage points for correcting it.

- **Keep straight books.** More and more, the accounting profession is moving toward valuing key assets at their replacement, not original, cost. Unfortunately, forest owners' books don't yet reflect the true value of intact forests, nor the ecological and social costs of losing them: they literally can't see the forest for the trees. The Systems Group will explore replacement-cost accounting as a way to help prices tell the truth.
- **Biodiversity 101.** Environmentalists often oppose unsustainable logging because it reduces biodiversity. But what's the economic value of biodiversity? The panel will draft a “primer” to help bridge the often wide gap in understanding of what forest biodiversity is and why it matters to the industries that forests support.
- **“Intergenerational commerce.”** The market is ruthlessly efficient at assigning a current liquidation value to timber, but often fails to value the future benefits of *not* extracting it. Hence the wants of one generation aren't forced to compete on an even footing with the needs of the next. For companies to take into account the needs of future generations, they must be able to profit from doing so in the present. The challenge is to devise practical mechanisms for “intergenerational commerce”—for example, “sustainability bonds” that invest in regenerative activities to enhance human and natural capital, and make repayment easier by building future wealth.
- **Anticipate “surprises.”** By not heeding the early warnings of crises—ozone depletion, climate change, acid rain—companies also fail to anticipate huge new markets for alternative products that avoid them. The group will attempt to identify similar “surprises” in the making related to deforestation, and help business develop proactive—and profitable—strategies to prevent them.



NATURAL HABITAT

What's Better than Green Housing? Affordable Green Housing

Green building design faces a potential image problem: too often, it's regarded as a luxury that only rich people or big institutions can afford. Habitat for Humanity International is out to change that perception, with the help of RMI's Green Development Services.

The stated mission of this Georgia-based organization, which is the world's largest nonprofit builder, is to "eliminate poverty housing from the face of the earth." Habitat's chapters, located across the United States and in more than 40 other countries, build 10,000 houses every year.

But, as Habitat founder and president Millard Fuller says, "The impact of this massive undertaking on our planet is not insignificant."

Concern about this impact led Habitat to set up a special department in 1992 to investigate ways of constructing houses with minimal environmental damage yet without sacrificing the economy of Habitat's existing designs, which are made as simple as possible to cut materials costs and harness volunteer labor.

Habitat chapters have a high degree of autonomy, but some have already begun experimenting with green design. One home built by the Lynchburg, Virginia chapter, dubbed the Earthwise House, uses an extensive menu of energy-efficient techniques: passive solar design, thicker insulation, superwindows, compact fluorescent lamps, solar water pre-heaters, and high-performance plumbing fixtures. As RMI has so often found, their added cost can be offset by making heating and air-conditioning systems smaller or unnecessary.

But the big payoff is in lower operating costs—all the more important for Habitat's low-income clientele. Notes Earthwise project coordinator Kevin Campbell: "For many of our families, utility payments cost as much as the mortgage."

A more ambitious Habitat project, still

on the drawing board, is an entire sustainable community in south Dade County, Florida, to resettle families whose homes were destroyed by Hurricane Andrew in 1992. The 200-home, \$17-million Jordan Commons project will incorporate people-friendly planning as well as green design. The houses will have natural cross-ventilation, white roofs to deflect solar heat, and an advanced water-treatment plant to reclaim water for irrigation. There will also be narrow streets to slow cars and encourage pedestrian use, trees for natural cooling, and public greens and amenities within walking distance of the houses.

These ideas have all been used before in high-end, "neo-traditional" communities, where homes typically cost several times more than those at Jordan Commons. Yet such developments draw on common-sense techniques used for centuries—precisely because they're efficient, and therefore affordable.

To develop a synthesis of green and affordable design concepts, Habitat teamed up with RMI's Green Development Services and two other environmental groups this past December to conduct a two-day symposium in Atlanta. Architects, builders, environmental experts, and

Habitat affiliates from 22 states came together to hammer out a set of guidelines for builders of low-cost green homes.

Among their recommendations: increased emphasis on reusing and renovating existing buildings (which, compared to building new ones, saves energy, money, space, and infrastructure); creating a network of building professionals to advise local groups; and initiating a model project to demonstrate the principles laid out in the report.

To a great extent, the problem of global security is the problem of sustainably feeding—and housing—the poor of the world. Applying techniques of green design to housing for the poor is an important step in the right direction. 🌍

SURPRISE!

Last November, RMI's Bill Browning thought he was going to the Massachusetts Institute of Technology's Real Estate Center to give a lecture. But when he arrived, he was presented with the 1995 Charles H. Spaulding Award—the center's honor for outstanding public service by one of its grads. Congratulations, Bill!

New Staff



Kate Mink

RMI's newest staff members (left to right): Robert Alcock, research/editorial intern; Louie Saletan, communications assistant; Brett Williams, transportation research associate; Tammie Repp, receptionist; and Gunnar Hubbard, green development research scholar.

PLAYING THE MARKET

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The Merritt group is literally practicing what RMI preaches. As a non-equity partner in the consortium and a consultant on a pilot project, Green Development Services is encouraging and helping these early adopters to realize a competitive advantage. If they do, competitors will be forced to follow, moving green design a step closer to the corporate mainstream.

CARROTS AND STICKS

Markets work on incentives. RMI has found that dangling a competitive carrot—the promise of greater profits, better services, or less risk—generally elicits swifter and surer improvements in resource efficiency than sticks like mandates and taxes. With the hypercar and Merritt initiatives, RMI has made an end run around policy debates, which are usually about which stick to use, by instead offering individual companies a chance to gain a competitive advantage over rivals. It's an offer they can't afford to refuse.

But in the case of the hypercar, there's a stick, too. The car companies' competitors have access to the same information. And if hypercar technology transforms the industry even a tenth as much or as fast as predicted, failure to pursue it may be fatal to an automaker's bottom line. By providing practical guidance toward the hypercar vision—and reminding firms that without vision the profits perish—RMI is not only presenting a new market opportunity but also substantially upping the risk of inaction.

Green Development Services has to take a different tack with real-estate developers. The market for real estate is intrinsically local, and within each local market developers carve out their own niches. Moreover, each project is unique. Thus if one developer produces an innovative product, others in the area need not rush out and match it—they can afford to wait to see how it fares financially before jumping on the bandwagon. This can take years.

But carrots still work. Green design can produce buildings that are not only cheaper to run but also more beautiful, comfortable, and healthful, which makes

them more marketable, which ultimately makes them more profitable to build. That message gets through to developers. Leading by example, GDS publicizes case studies of successful green projects and quantifies their bottom-line benefits, and is currently preparing a book aimed specifically at real-estate developers.

EXPLOITING RIVALRIES

If resource efficiency is so profitable, why isn't Rocky Mountain Institute making a killing? Why, for example, doesn't it patent the hypercar concept and license it?

Of course RMI's aim is to promote resource efficiency, not to make a profit. But more to the point, the Institute can advance such good ideas far better by giving them away.

If you have an idea for a product and you start a company to manufacture it, you might fail. If you patent the idea and license it to another company, the licensee might fail to bring the product to market (perhaps even deliberately). But if you give the idea to two dozen companies, and exploit their rivalries just a bit to maximize the competition between them and get them fighting over it—well, your idea will be off to a running start.

So instead of starting one hypercar company, RMI has in effect started two dozen. That's 24 cracks at developing a viable hypercar design—and 24 companies keenly motivated to do so because each knows that the other 23 are doing the same. It's a Darwinian approach: may the best design win. RMI plays no favorites; it just wants results. There's nothing like competition to stimulate good ideas, and to make good ideas better.

FORGING ALLIANCES

Sometimes cooperation is in order. Where appropriate, RMI acts as a matchmaker within the budding hypercar industry, helping forge alliances between bigger, stronger companies and smaller, more nimble ones.

In the case of the Merritt green-buildings initiative, Green Development Services is an actual partner in the mar-

ket-driven consortium. This direct participation gives GDS staff greater access to the other partners, and greater influence over the development of green products and services. The downside, of course, is that it allies RMI to a small group of players in the market, but the ultimate purpose of this alliance is to motivate others. And RMI has ways of getting their attention: if one firm won't play, at least one of its competitors probably will.

GDS is looking into other ways to influence companies through active partnership. Another initiative, already well under way, is to work with four commercial development-design teams to test performance-based fees that reward architects and engineers for what they save, not for what they spend. Such attention to correcting perverse incentives, so we reward what we want rather than the opposite, builds an essential foundation for enabling markets to do what they do best—without trying to make them do things they can't do at all, such as substituting for ethics, religion, or politics.

Sooner or later, good ideas win out. RMI's job is to make sure it's sooner, since delay in addressing environmental problems only compounds them. Market competition will do most of the work, but sometimes it takes a timely nudge from a cranky little nonprofit to get the process going. 🌱

**PAPER: BAD NEWS,
GOOD NEWS**

The bad news is that, so far at least, we've been unable to find grant funding to print this newsletter on wood-free kenaf paper (Summer 1995 *Newsletter*). Kenaf currently costs about seven times more than regular paper.

The good news is that with this issue we are switching to a 100-percent-recycled paper with 20-percent post-consumer content. This paper is produced by a process that involves no elemental chlorine and results in no detectable dioxins. Previously we used 50/20 paper that wasn't chlorine-free.

BACK TO THE FUTURE

RMI's Securing the Future Campaign Enters an Urgent New Phase

It's full steam ahead on the Securing the Future Campaign, announced in our previous newsletter. RMI's first capital fund-raising effort seeks to raise \$3 million to purchase a half-interest in the nearby 957-acre Windstar property. Success will secure a permanent home for the Institute and forever protect critical elk habitat and beautiful wildlands from development.

A fundraising committee is now in place, including members of RMI's Board as well as other supporters and local residents concerned with preserving the land and helping the Institute. More than \$170,000 has been raised to date from Board and staff members and the Rocky Mountain Elk Foundation, as well as from the generous readers of this newsletter.

But a deadline looms, and the campaign is now entering an urgent new phase. By 31 December, RMI must pay the National Wildlife Federation the \$1.5 million purchase price or the price goes up by \$100,000. And if \$1.6 million isn't paid by 30 June 1997, the whole deal evaporates and RMI forfeits its \$100,000 earnest money. (The balance of the \$3 million target, earmarked for land and building restoration, can be raised later.)

This campaign presents a real challenge



Critical effort: Besides creating a permanent home for RMI, the campaign will protect vital habitat for one of the largest migratory elk herds on the continent.

Robin Henry

for RMI, culturally as well as financially. The Institute has historically been very shy about asking for money, preferring to rely on donations received through a low-key annual appeal. It has never sought big contributions, and in fact has never received an individual donation over \$30,000.

But a capital campaign requires large "leadership" gifts. Fund-raising experts say a campaign like this one must bring in roughly half its total from just a dozen donors—which means some gifts will have to be in the six-figure range if this campaign is to reach its goal. Donations of all sizes will make up the other half.

So please help in whatever way and amount you can. The campaign seeks tax-deductible gifts from caring individuals, businesses, and foundations, either made outright or pledged over a three- to five-year period; pledges are almost as good as cash because the Institute can inexpensively borrow against them.

Your donation will benefit Rocky Mountain Institute in many ways. RMI will never have to relocate. Its office and staff housing costs will remain fixed. It will at last have enough space, and be able to unite all its key staff in one place. And it will gain new opportunities to demonstrate how to live better in ways that are less costly to people and the earth.

The land and its natural inhabitants will benefit even more. As Wendell Berry once remarked, "What I stand for is what I stand on." In accepting responsibility for the Windstar property, RMI acknowledges its obligation to place and to community.

Your participation will help ensure the Institute's well-being and vitality, and it will help preserve our diminishing natural lands and wildlife—our legacy to future generations. For more information, please contact Campaign Coordinator Judy Moffatt or RMI Executive Director Hunter Lovins. 🌱

RISKY BUSINESS

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ing to get them to internalize these costs by persuading several West Coast regulatory commissions to require utilities under their control to make their fuel suppliers bear the risk of future regulation of greenhouse-gas emissions. In other words, if the federal government enacted a carbon tax, utilities would get reimbursed by, say, their suppliers' insurers, who would have to decide what that risk is worth.

Since then, Cavanagh has doggedly demonstrated to electric utilities that such regulations—or their mere *possibility* in the future—constitutes a risk they must

disclose to investors. And if they don't do it, he knows some bond-rating services on Wall Street that might be interested in the information. In his latest project, Cavanagh and his colleagues are developing a system for ranking utilities' exposure to the financial risks associated with future limits or taxes on carbon-dioxide emissions.

Since some utilities rely far more on fossil fuels (especially coal) than others, such disclosure would give "good guys" a competitive advantage, and give the rest a strong incentive to clean up.

If it all sounds arcane and roundabout, that's because it is—but it's the sort of strategy that gets results in the corporate world. Rising sea levels don't motivate utility companies; lower bond ratings do.

"We're trying to align economic self-interest with solving the greenhouse problem," Cavanagh says. RMI has demonstrated that companies will often move pretty darned quickly when they see the financial rewards of abating global warming. But sometimes, as Leggett and Cavanagh are proving, they also need to be shown the risks of not acting. 🌱

A TALE OF TWO SYSTEMS

British Megawatts or California Negawatts?

In theory, theory and practice are the same; but in practice, they're not. So it is in the electric utility industry, where recent restructuring attempts around the world have often lacked a grounding in practical economics, resulting in unintended consequences. As regulators in Britain and California are finding out, getting the incentives right is fundamental to ensuring true competition.

When Britain started privatizing its electricity industry in 1990, one problem immediately became apparent: nobody wanted to buy the nuclear power stations. Financiers cited uncertainty over decommissioning costs. The markets also perceived that the industry was only showing an operating profit thanks to mandatory power purchases by the government, substantial taxpayer subsidies (due to expire soon), and free liability waivers (which Members of Parliament have suggested should start to be paid for).

Now the British government is again trying to sell most of its nuclear stations—this time by promising to cover decommissioning costs, which, if correctly assessed, could make the plants' present value negative. In other words, the taxpayer, who paid to build them, will have to pay about as much to get rid of them.

Other problems with the 1990 break-

up are only now coming to light. All the previously nationalized generating capacity in England and Wales went to two companies, PowerGen and National Power. Their duopoly effectively sets the marginal price of power—hardly real competition. Meanwhile, the regional distribution companies are rewarded not for reducing customers' bills but for selling more kilowatt-hours, and the government-appointed regulator is powerless to correct this perversity. The result? The boosting of most customers' bills, shareholders' profits, executives' salaries, campaign contributions, and Britain's outputs of carbon dioxide.

Theoretical economists are now holding up the British system (which already has parallels in Chile, Norway, and New Zealand) as a paragon of success to emerging nations, especially in Eastern Europe. Their governments would do well to study a more practical system about to be introduced in California.

The new system proposed by the California Public Utilities Commission in December marks a significant shift from the "retail wheeling" plan it had been considering for more than a year and a half (Fall/Winter 1994 *Newsletter*). Though retail wheeling was touted as a way to boost competition by letting customers

buy electricity from any supplier, RMI and others argued that it would only shift costs from big to small customers and reduce utilities' incentives to invest in energy efficiency, environmental improvement, source diversification, and vital R&D.

The CPUC's new policy essentially follows recommendations made by RMI in 1995 at the invitation of the commission's president (see RMI publication U94-18). Called "efficient direct access," it captures the essential benefit of competition in supplying electrons at the wholesale level, and even gives retail customers phased-in opportunities to "shop around" for better deals without shifting their costs to others. But it also places strong emphasis on customers' responsibility, through a universal per-kilowatt-hour charge, to pay for "stranded" assets and public goods such as efficiency, renewables, and R&D.

Such incentives have a proven capacity for profit. During 1990-93, California utilities' investments in "negawatts" saved Californians nearly \$2 billion net.

When it comes to regulatory policy, the rest of the country often perceives it's "California today, here tomorrow." Though the CPUC never formally adopted retail wheeling, its mere proposal in 1994 led the media and markets to call it a *fait accompli*. Panicky utilities, faced with diving stock prices, slashed R&D and efficiency programs—exactly the efforts which, RMI believes, will help ensure their survival in an increasingly competitive market.

The utilities need never have worried. In reality, raw, unregulated retail wheeling has never been seriously introduced in any of the United States. Rather than following the theoretical muddle of the British system, other states and countries may now start to follow California's lead in combining the best of both worlds—wholesale competition to elicit cheaper electrons, plus incentives to use those electrons more efficiently. 🌐

¡OLE!

The proposed "OLE" power line through New Mexico's sacred Jemez wildlands (Spring 1993 *Newsletter*) has finally been laid to rest.

In 1984, Public Service Company of New Mexico proposed constructing the 50-mile power line through a pristine part of the Jemez, which includes important archaeological sites and Pueblo Indian shrines. A coalition of concerned citizens, Save the Jemez, formed to contest it. RMI's Amory Lovins, one of many experts called to

testify on the proposal, showed how the power line could be replaced more cheaply a dozen times over with efficiency alternatives.

The case passed through the Bureau of Indian Affairs, Federal District Court, and the Court of Appeals in Denver before reaching New Mexico's Public Utilities Commission. In January, after three years of consideration, the PUC finally issued a decision against the power line. The last date for appeal passed on 8 February. 🌐

OVERCOMING CULTURAL INERTIA

How the Strategic Application of Technology Can Help It Win

As described in previous newsletters, hypercar bodies would probably be made from advanced composite materials, as stiff and strong as steel but much lighter. Their great performance-to-mass ratio makes them great candidates for a key role in the hypercar concept.

Composites have numerous advantages besides their light weight, such as good energy absorption for crashworthiness, seemingly unlimited styling potential, excellent corrosion resistance, and radically cheaper manufacturing equipment. All of these should make them a good fit for any automobile, not just for hypercars.

So why aren't composites used more in cars already? Mainly because of cultural barriers within the auto industry—such as automakers' unfamiliarity with and distrust of composites; billions of dollars invested in steel-based technologies; and the perception that composites are expensive and impossible to recycle.

How to vault these cultural barriers?

Researchers in RMI's Hypercar Center suggest that composites in themselves probably won't do it, but their strategic application could. In other words, com-

posites may only reach their full potential when they are designed and implemented as a whole system.

In conventional practice, "materials substitution" means replacing one part at a time—the hood, say. While this approach may capture some of the potential benefits of composites, it tends to create more problems than it solves.

For example, a composite hood in an otherwise all-steel car:

- usually takes longer to make, thus requiring extra equipment and cost to keep up with steel's fast rates of production;
- generally does not fit well with its surrounding steel parts, as the shape of polymer composites and metals shift differently with temperature; and
- often makes the car less recyclable, since the composite part is usually treated as worthless "fluff" in a recycling infrastructure intended for steel.

The part usually ends up being changed back to steel. Worse, such incremental applications of new materials often create further cultural barriers by providing examples to back up the traditionalists' claims that "composites don't work."

What's needed, then, is for automakers to leapfrog from using composites incrementally to producing an ultralight, all-composite car. For example, as described in the Summer 1995 *Newsletter*, an all-composite car body could possibly use just one type of plastic, in relatively large amounts, with valuable fibers embedded in it (and processes are being developed for retrieving these)—two facts that could encourage and facilitate recycling, turning "fluff" into valuable raw materials.

To learn more about how the strategic implementation of a technology may reduce the resistance to its use, read "Ultralight-Hybrid Vehicle Design: Overcoming the Barriers to Using Advanced Composites in the Automotive Industry" (T95-39). The paper was presented to the Society for the Advancement of Material and Process Engineering on 28 March.

Or if you happen to be an automaker, materials company, financial analyst, business strategist, policymaker, or someone else with an institution-sized need-to-know (and checkbook), ask about RMI's monumental new proprietary study, *Hypercars: Materials, Manufacturing, and Policy Implications* (450 pp, \$10,000). 🌐

New Publications

GENERAL

How Not to Parachute More Cats. Updated version of RMI's classic statement of principles. G96-1 16 pp, \$8.00

RESOURCE-EFFICIENT BUILDINGS

Foreword to *Sustainable Design Guide of the Japan Institute of Architects.* An overview of the East-meets-West opportunities in green building design. D96-3 5 pp, \$3.00

ELECTRICITY & ELECTRIC UTILITIES

Comments on FERC's "Mega-NOPR." The Federal Energy Regulatory Commission's proposed principles for wholesale competition need to accommodate efficiency and renewables fairly. U95-37 2 pp, \$1.50

TRANSPORTATION

Ultralightweight Hybrids—The Coming Revolution. Interview with Amory Lovins in the British journal *Electric & Hybrid Vehicle Technology '95*. T95-38 4 pp, \$2.00

Ultralight-Hybrid Vehicle Design: Overcoming the Barriers to Using Advanced Composites in the Automotive Industry. How a whole-system approach can speed the shift from steel to composites (see article, this page). T95-39 17 pp, \$10.00

Light Hybrid Vehicles: An Engineering Strategy for Commercial Viability. Recommendations to the Engineering Society of Detroit for moving hypercars from theory to practice; this paper is a shorter version of

"Vehicle Design Strategies to Meet and Exceed PNGV Goals" (T95-27). T96-5 7 pp, \$4.00

Supercars: Advanced Ultralight Hybrid Vehicles. A broad, semi-technical primer reprinted from *The Encyclopedia of Energy Technology and the Environment* (which went to press before we changed the name to "hypercars"). T95-34 32 pp, \$12.00

WATER

Water 2010: Four Scenarios for 21st Century Water Systems. Results of a scenario planning exercise conducted for the EPA, envisioning four hypothetical futures for the U.S. water industry (see the Fall/Winter 1995 *Newsletter*). W96-4 21 pp, \$9.00

1995 FINANCIAL RECAP

When Hunter and Amory Lovins founded RMI, they never dreamed it would have 43 staff or a \$2-million budget. Fifteen years later, it does. With average salaries under \$23,000, our dedicated staff strives greatly and achieves much. The biggest challenge is finding \$6,125 every day.

RMI's regular nomadic-hunter-gatherer cash flow was stabilized by a fund set up for that purpose by the Joyce Mertz-Gilmore Foundation in 1994. Our gratitude goes out to all who helped us find forage and oases in '95, achieving these results:

- Expenses rose from 1994's \$1.86 million to \$2.24 million (including \$200,000 in pass-through grants). After inflation, the net amounts to a 1-percent decline per full-time staff member.
- Revenues rose 27 percent to \$2.47 million.
- The \$230,000 surplus was our eighth

- in 14 years; in 1994, we lost \$170,000.
- We ended 1995 with three months' operating funds (now back down to the usual few weeks).
- Total assets reached \$4.01 million, net worth \$1.23 million.
- We earned 45 percent of our income; most of the rest came from foundation grants (39 percent) and individual donations (8 percent).
- The 45-percent earned income was up sharply from 20 percent in 1993 and 26 percent in 1994, and well diversified.

In 1996, foundation rules limiting duration of support will prevent the renewal of two grants totaling \$230,000. The Institute needs extra help to make up that shortfall, which leaves Energy Outreach, RMI's longest-running and best-known activity, fielding over a thousand queries a month with no current grant support. ☹

TWO WAYS YOU CAN HELP

It's eight o'clock—do you know where your money is? Here are two ways you can put your personal resources to work saving everyone's:

1. Consider making a tax-deductible donation or pledge to the Securing the Future Campaign (see page 7). Your gift may be spread out over three or five years if you desire.

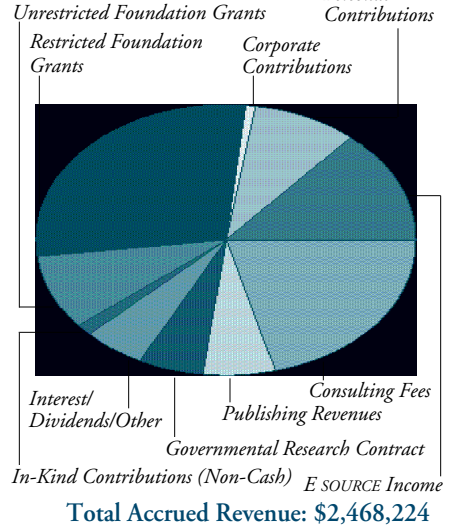
Planned gifts are another option. If you are considering selling highly appreciated assets such as stocks, real estate, or a business, a variety of planning techniques may enable you to help RMI while simultaneously achieving a number of your own financial goals—creating income tax deductions, avoiding capital-gains taxes, reducing estate taxes, and increasing lifetime income. Please contact Campaign Coordinator Judy Moffatt or Development Director Farley Sheldon for details.

2. Explore investing in RMI's Facilities

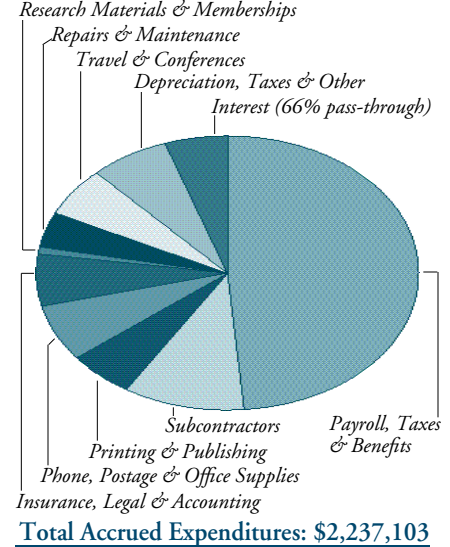
Improvement Fund. Last year, we invested \$88,000 in computers, phones, reroofing and reglazing, and other long-term capital items for which we borrowed \$50,000 from friends like you and repaid \$36,000 on prior loans. We therefore spent \$74,000 of scarce operating cashflow for capital items we'd rather have financed.

RMI can pay interest typically higher than a bank would pay you, but less than it would charge us. If you have maturing CDs or other funds you'd feel better about our putting to work, please contact Comptroller Danny Kermodé or Farley Sheldon. Notes are typically in the \$10,000–\$50,000 range, level-payment, with various maturities. The Institute takes pride in its decade-long perfect payment record to several dozen private lenders. RMI doesn't borrow for operating expenses, and has a diversified income 43 times as big as its debt service. ☹

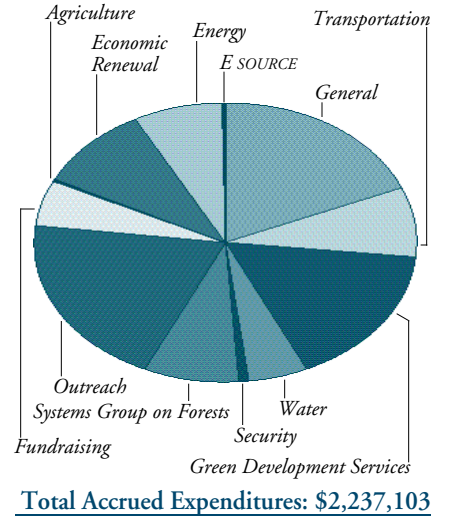
SOURCES OF REVENUE



EXPENDITURES BY CATEGORY



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Our sincere appreciation is offered to these friends who have contributed to RMI's support between 1 September and 31 December 1995. Numbers in parentheses indicate multiple donations. Please let us know if your name has been omitted or misspelled so it can be corrected in the next issue.

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