



## TURNING OVER A NEW LEAF

### *Out of "Boycott Mitsubishi" Grow Two Far-Reaching Sustainability Efforts*

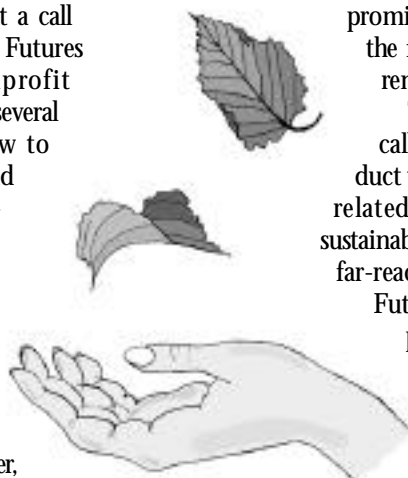
In August 1994, RMI's Amory Lovins got a call from Bill Shireman, president of Global Futures Foundation, a California-based nonprofit resource policy center. Shireman was advising several companies in the Mitsubishi family on how to respond to Boycott Mitsubishi, a four-year-old campaign organized by Rainforest Action Network over what RAN says are the multinational group's unsustainable logging practices. Shireman explained that the Mitsubishi companies and RAN had named Lovins as someone they could trust to facilitate a dialogue.

Thus began one of the most exciting chapters in RMI history—and one which, a year later, can finally be told.

Forestry is not RMI's forte, although Hunter Lovins cofounded Tree People, a Los Angeles-based urban forestry group, in 1973. More to the point is the Institute's special knack for showing corporations how saving resources is in their economic self-interest. Ever since a pivotal gathering last summer (see the Fall/Winter 1994 *Newsletter*), RMI has redoubled its search for leverage points within the corporate world to bring about a more sustainable future. Shireman's invitation was like a big, shiny lever with a label saying "Use me."

Lovins and other RMI staff steered intense discussions throughout the spring and early summer, and hosted top-level meetings at the Institute's headquarters in February and May. It remains to be seen whether RAN and Mitsubishi Corporation (the Japanese trading member of the Mitsubishi family, and the real target of RAN's campaign) can fully settle their differences. Their positions are entrenched, and compromise by either side at this point could involve difficult loss of face. Through RMI's mediation, both parties have at least agreed to enter a non-binding dialogue to resolve factual differences about what the firm is doing.

But out of their conflict is emerging a pair of initiatives that



promise to go far beyond Mitsubishi or RAN or the forests they are fighting over—and may well render their disagreement irrelevant.

The first of these is the convening of a panel, called the Systems Group on Forests, to conduct the most fundamental study to date of forest-related practices and alternatives that are both sustainable and profitable. The second and even more far-reaching initiative is the establishment of the Future 500, a roundtable to help member companies explore and pursue fourfold (or better) increases in resource efficiency as a path to greater profit and competitiveness.

Special credit for these actions must go to two visionary executives of Mitsubishi Electric America and Mitsubishi Motor Sales America, Tachi Kiuchi and Richard Recchia, who have been largely caught in the crossfire between RAN and the separate Japanese trading company sharing the same name. Rather than seeing the boycott as an attack to be repulsed, they have used it as an opportunity to improve their companies' practices and reputations, and have committed substantial resources to making their companies more environmentally responsible. In a typical example, Mitsubishi Motor Sales America in April withdrew its sponsorship from the Eco Challenge, an endurance race in Utah being filmed for MTV, when it learned that the course passed through fragile wildlife habitat. These executives are in the vanguard of an emerging trend at the highest levels of many corporations,

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### The Newsletter

The Rocky Mountain Institute *Newsletter* is published three times a year by Rocky Mountain Institute, an independent, nonpartisan, nonprofit resource policy center in Old Snowmass, Colorado. Rocky Mountain Institute was founded in 1982. It has a staff of approximately 40 full-time, 45 total. The *Newsletter* is distributed from the Institute's headquarters to nearly 26,000 readers in the U.S. and throughout the world.

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#### LETTERS TO THE EDITOR

The editors of the RMI *Newsletter* want to hear your comments, criticism, or praise relating to any article printed in the *Newsletter*.

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### About the Institute

Rocky Mountain Institute is a 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.

We focus our work in seven areas—Agriculture, Economic Renewal, Energy, Green Development, Security, Transportation, and Water—and carry on international outreach and technical-exchange programs. Our E SOURCE subsidiary (1033 Walnut, Boulder, CO 80302-5114, 303/440-8500, FAX -8502) is the leading source of information on advanced techniques for electric efficiency.

## PERSPECTIVES

By L. Hunter Lovins, Executive Director

**W**e have some terrific people on our board of directors. One such is Dr. Chip Bupp, Managing Director of Cambridge Energy Research Associates, and one of the world's foremost energy analysts. Sitting in on one of Chip's informal talks on the state of the world's energy resources, which often round out our semiannual board meetings, is like eavesdropping on a Presidential briefing.

But Chip's most recent chat worried even the most optimistic RMItes.

The story begins well enough: the effort to provide electricity to the developing world, which most people would say is a necessary condition for economic and environmental progress. Countries everywhere are trying to expand their economies by expanding industry, and industry needs electricity. Chinese manufacturers complain that they can't run their plants without more power. Indian planners foresee rising electricity demand with no end in sight. People all over the world want to better their lives with refrigerators and lights.

The trouble is, Chip reminds us, power plants are vastly capital-intensive. A good-sized one with all the bells and whistles costs more than some countries' annual budgets. A large part of RMI's early years got spent convincing utilities in wealthy countries that they couldn't afford to build new power plants. Now the entire developing world seems to be sleepwalking down the same supply-side path.

The numbers Chip quotes are staggering: 5 gigawatts of capacity sold in 1991, 10 in 1992, 15 in 1993, 20 in 1994, 25 projected in 1995. It's the nearest thing to a gold rush in our time. Everybody's striking it rich: financiers and middlemen who close the deals collect multi-million-dollar commissions, equipment vendors and contractors earn huge fees, and "local partners" pocket princely kickbacks.

Chip fears the juggernaut is unsustainable and a collapse is coming. It's WPPSS writ large—a replay of the Washington Public Power Supply System, which defaulted in the late 1970s, losing bondholders and ratepayers \$13 billion.

Assuming steadily rising demand for electricity, governments are signing contracts guaranteeing power sales at unportable tariffs, often many times today's highly subsidized ones. Add up all the



commitments made by China, says Chip, and it appears that a billion people will have to spend a significant fraction of their *total* income on electricity over the next 20 years just to pay off the investment. Even if they do so, money needlessly invested in power plants will be diverted from

other vital development needs.

And the more fossil-fuel-burning power plants on Earth, the more carbon dioxide emitted into the atmosphere. Nuclear plants—still considered competitive with coal by some developing countries—are even worse, generating nuclear waste and offering do-it-yourself bomb kits (see p. 4).

Amory would say that efficiency and renewables are the answer. It's worth a try, but "let them eat compact fluorescents" is a hard sell in countries where most people would be happy just to have any bulb. And compared to the billions of dollars at stake and the perverse incentives dangling in front of all the key players, the ideology of efficiency has few bribes, commissions, and ribbon-cuttings to offer.

The underlying assumption here is that economic development means using far more electricity. No one seems to be challenging it (except RMI—see publication E91-23). As Chip Bupp says, anyone who can come up with a viable alternative deserves the Nobel Prize.

Any volunteers? ➔

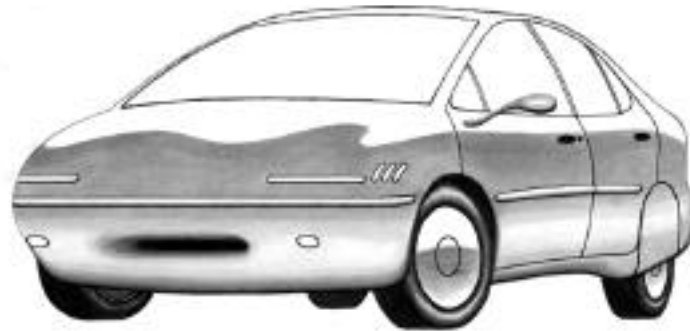
## MORE JOBS, LESS FLUFF

### *Hypercars Save More Than Just Fuel*

One hundred fifty to 300 miles a gallon, New York to L.A. on a single tank of gas: fuel efficiency is the main attraction of hypercars, right?

Not necessarily, according to *Hypercars: Materials and Policy Implications*, a book-length technical report prepared by RMI's Hypercar Center for The Joyce Foundation. As it turns out, saving more fuel than OPEC currently extracts could be just one of many effects—most of them positive—of a shift to the superefficient, hybrid-electric vehicles envisioned by RMI. Here are some likely consequences, assuming hypercars achieve market saturation:

**Materials use.** Automobiles use roughly 70 percent of America's lead, 34 percent of its iron, 20 percent of its aluminum, 14 percent of its steel, and 10 percent of its copper. Switching to hypercars, which weigh barely a third as much as conventional cars, would initiate a radical "dematerialization" in the auto industry. The only important increase would be in poly-



*A rendering of an illustrative early hypercar.*

mers, which form the basis of the hypercar body—yet because total polymer use is so big and hypercars are so light, they would only increase U.S. plastics use by a few percent.

In addition, hypercars could eliminate or significantly reduce as many as nine of the eleven main categories of spare parts (filters, spark plugs, belts, light bulbs, etc.), many of which are disposable. For example, each year 400 million oil filters are thrown away; hypercars, being more

efficient, could run economically on such simple and benign power sources as fuel cells, which have no moving parts and therefore need no oil.

**Employment.** The transition to hypercars may be difficult for many auto workers, but a preliminary economic analysis suggests that labor stands to gain overall. Manufactured by a fundamentally different process (molding), the hypercar's composite body could take twice as many worker-hours to make as its steel ancestor's, yet cost a little less because of far lower tooling and equipment costs. This conclusion is now being tested in collaboration with a noted technical-cost modeling firm.

That's good news for an auto body industry that has lost 120,000 jobs since 1978. And while the hypercar industry would be as automation-prone as any other, manufacturers would have to cut their labor intensity by 70–80 percent to eliminate as many jobs as are *already* projected to be lost in making auto bodies.

As with all high-tech advances, hypercars would probably create new, highly skilled jobs at the expense of old, semi-skilled assembly-line jobs. Depending on how the emerging industry approaches retraining, this trend could leave many workers in the lurch—or it could offer them an opportunity to join the ranks of the highly skilled (and highly paid).

**Occupational health and safety.** Manufacturing hypercars—particularly  
*(continued on p. 8)*

### A Hypercar By Any Other Name...

Two years ago, President Clinton challenged the Big Three automakers to make a production prototype for a marketable family car that can go 80 miles on a gallon of gas by the year 2004. Out of that challenge grew the so-called Partnership for a New Generation of Vehicles (PNGV), which was greeted with all the usual fanfare and cynicism that such public-private initiatives usually arouse. Most observers expected PNGV simply to give these industrial behemoths a warm feeling for making the same incremental refinements to their products that they would have made anyway, rather than making the jump to ultra-efficient, ultralight-hybrid designs—"hypercars," as RMI calls them.

How gratifying, then, to find that the conceptual designs leaking out of the various PNGV camps lately bear an uncan-

ny resemblance to RMI's hypercars.

All three manufacturers are of course playing their cards close to their chests. However, recent statements suggest they believe that an 80-mpg six-seater is attainable only by pairing ultralight materials with a more efficient hybrid-electric drivetrain. And while many challenges remain in making these systems workable, the consensus seems to be that these difficulties can be overcome in time for 2004. Indeed, off the record, some researchers say they think they'll be able to beat 80 mpg (see p. 8); they just don't want the government to hold them to it.

The Big Three may not be as quick as some smaller companies in bringing hypercars to market. But it seems they're positioning themselves to do so—and when they do, the hypercar revolution will truly be here. 🌐

## A TREATY WHOSE TIME HAS COME

### *The Nuclear Nonproliferation Treaty Is So Far Out It's In*

Good news is rare, and usually fleeting. So when the nations of the world agreed in May to an indefinite extension of the 1970 Nuclear Nonproliferation Treaty, the story received little play and even less analysis. Yet the NPT now stands a better chance than ever of actually working—not despite, but *because*, just about all its factual premises are dead in the water.

As RMI's Amory and Hunter Lovins wrote in *Foreign Affairs* way back in 1980, on the eve of an earlier NPT review conference, the treaty is inherently contradictory. When it was negotiated in the late 1960s, most experts thought nuclear bombs were impossible to steal and immensely hard to make. And since the worldwide spread of "peaceful" nuclear power was regarded as a Good Thing, the slight risk of bomb proliferation seemed a small price to pay for this marvelous boon to humanity.

The NPT, then, attempted to contain

### Thanks!

It's been a hectic few months keeping up with the flood of orders for *Home-made Money*, *The Community Energy Workbook*, and *A Primer on Sustainable Building* which were announced in the previous *Newsletter*.

Now that we've had a chance to catch our breath, we'd like to express our great appreciation to the following organizations that provided funding to make the books possible: The Educational Foundation of America, W. Alton Jones Foundation, Golden Rule Foundation, Allen-Heath Memorial Foundation, GAG Charitable Corporation, Merck Family Fund, Eugene B. Casey Foundation, the U.S. Department of Energy (Urban Consortium Energy Task Force), and the U.S. Environmental Protection Agency.

Thank you for your support!

the proliferation of bombs while at the same time making access to nuclear power technology an "inalienable right" of all signatories (now 178, including Libya and Iran, and recently Iraq and North Korea).

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### *Global revolutions in energy, development, politics, and security can resolve the NPT's internal contradictions.*

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Against the backdrop of the Cold War, it formalized an elite nuclear "club" of countries with bomb capabilities and offered the rest reactors as consolation prizes. The International Atomic Energy Agency (IAEA) was charged to enforce nonproliferation *and* promote nuclear power.

By 1980, it was obvious to observers like the Lovinses that nuclear power was a commercial as well as an environmental failure. Its only success was in fueling the proliferation of nuclear weapons—the very thing it was supposed to prevent.

Fifteen years later, few dispute the reactor-bomb link. Technical advances have so blurred the line between civil and military that virtually no *exclusively* peaceful nuclear activities now exist. Technical and political barriers to bombs are so eroded that scores of countries can vault right over them, as Pakistan and South Africa did.

Even subnational groups can buy bomb materials and skills. Plutonium is as easily smuggled as heroin, but more valuable and deadly: a baseball-sized piece, plus other commercially available components, can make a bomb thousands of times more powerful than the one that detonated in Oklahoma City. The NPT's promotion of nuclear power lends these some-assembly-required bomb kits an innocent-looking civilian cover: proliferators and suppliers claim their trade is peaceful, vital to development, and legally

protected.

Meanwhile, the arms race has collapsed, and with it the justification for the hypocrisy that a few "responsible" countries should keep bombs, while a few others qualify for "don't ask, don't tell."

So if the NPT's first 25 years have been such a sham, why is it good news that it's been extended?

Fortunately, nuclear power is withering—albeit slowly—in the face of market forces, and lingers only in centrally planned energy systems. Worldwide capacity in 2000 will be less than one-tenth of the IAEA's lowest 1973 projection; recent orders are 1 percent of projections. Efficiency, natural gas, and renewables have displaced the energy that was to have been produced by nuclear plants, at a fraction—for efficiency, about one-tenth—of the cost.

These new energy and economic realities have blown the cover off "peaceful" uses of nuclear power. Countries like Iran that insist on more expensive nuclear reactors reveal their unambiguously military intent. This unmasking should make bomb materials, equipment, and skills harder to get, more conspicuous to try to get, and politically costlier to be caught trying to get—making proliferation, if not impossible, at least far more difficult and readily detectable.

Properly linked, the global revolutions in energy, development, politics, and security can resolve the NPT's internal contradictions. The IAEA could then concentrate on what it does fairly well (technical safeguards), abandon its conflict of interest (promoting obsolete nuclear power), and leave private firms and other entities to foster truly peaceful and affordable energy options. Then we can finally achieve the treaty's goals, which look sounder every year.

*This article is adapted from an op-ed by Amory and Hunter Lovins in the 27 April 1995 Christian Science Monitor (S95-21).*

## THE ENERGY DIRECTORY—THE KIT

### *A Grassroots Project Coming to a Community Near You*

Last year RMI brought out a booklet called *The Energy Directory*, a guide to resource-efficient goods and services in our local area. With the help of local Rotary clubs, more than 3,000 copies of the little blue book have been sold or given away in a valley with a population of only 30,000.

The project allowed us, as the old saying goes, to “think globally, act locally.” Now you can, too. A sequel, *The Energy Directory Kit*, provides communities around the country with a do-it-yourself template they can use to publish their own local directory.

Produced with funding from The Educational Foundation of America and The W. Alton Jones Foundation, the kit sows the seeds of resource efficiency at the grassroots level, letting local environmental or civic groups tailor the message to their own audiences. It’s a rewarding project for folks working for greater sustainability and self-reliance in their community.

Producing a local energy directory is a classic win-win proposition for all concerned. Emphasizing the economic as well as the environmental benefits of resource efficiency, RMI’s directory benefits its readers, the community that sponsors it, and the planet. By recommending cost-effective ways to save energy, it helps put money back in the pockets of community residents, who will



then invest at least some of that money locally. Businesses that sell the products and services listed in the directory benefit from increased sales. All that boosts the local economy, which in turn increases tax revenues, attracts potential new businesses, creates jobs, and fosters community spirit. And of course local energy savings mean global benefits to the environment, in the form of reduced emissions from power plants and reduced reliance on the fossil and nuclear fuels that run them.

*The Energy Directory Kit* is designed to make creating a local directory as much of a no-brainer as possible. The text is already written, complete with alternate wordings for different climates; for users, the main task is to list local suppliers of the goods and services mentioned. (We found this elicited many new suppliers anxious not to be left out.) The kit contains a fill-in-the-blanks directory on diskette, an extensive “creator’s manual” that explains everything from funding to printing, a copy of the original *Energy Directory*, a copy of RMI’s book *Homemade Money: How to Save Energy and Dollars in Your Home*, and camera-ready artwork.

*The Energy Directory Kit* (E95-23) costs \$99.00, and is available in a variety of DOS, Windows, and Macintosh word-processing formats. 🌐

## RMI IN ITS OWN BACKYARD

Sustainability, like democracy, starts with an involved local citizenry. While much of the work we do at RMI is global, big-picture stuff, we know that global thinking doesn’t count for much if it isn’t matched by local action. Recently we’ve been particularly active in our own Roaring Fork Valley, helping introduce end-use/least-cost ideas to transportation planning and green principles to real-estate development.

In Colorado, as elsewhere, transportation planning is where utility planning was 20 years ago: supply-side approaches abound, subsidies distort true costs, and the public is rarely involved in discussing alternatives. This spring, with valley residents sharply divided over a proposed four-laning project, RMI researcher Alice Hubbard couldn’t resist the opportunity to apply some of the things we’ve learned through community-based energy planning to the local transportation debate.

Working with a local citizens’ group and local government, Hubbard has helped initiate a collaborative process that is bringing more creative solutions to the upper valley’s traffic problems. With increased citizen involvement and serious discussion of the

alternatives, a forthcoming environmental impact statement may yet fairly evaluate least-cost transportation choices.

Meanwhile, RMI staff have begun advising officials in Basalt—a booming suburb of Aspen—on curbing runaway growth. With big money riding on the growth, we know it will take constant participation in public meetings to bring about a more sustainable pace and type of development. But since RMI’s Green Development Services boosts profits, we hope for a win-win resolution.

Elsewhere in the valley, researchers have helped Aspen and Carbondale tighten energy-efficiency standards in their building codes, consulted on a renovation of the Pitkin County Courthouse, and advised local skiwear manufacturer Obermeyer on incorporating green development principles into a new warehouse.

Many of you are probably also working to bring about greater resource efficiency in your own communities. We’d like to hear about your successes, and what kinds of barriers you run into. We also have a variety of tools that can help: new releases include *The Energy Directory Kit* (see above), *The Community Energy Workbook*, and *A Primer on Sustainable Building*. 🌐

**A NEW LEAF** continued from page 1

where there is a real sense that business as usual cannot endure, and that it is smart business to become part of the solution instead of part of the problem.

But even the most positive actions by a couple of responsible companies can't change industry norms unless all companies have the same commercial incentive to change. Recognizing this, Mitsubishi Electric America and Mitsubishi Motor Sales America have agreed to put up \$110,000 in seed money to create the Systems Group, which by the time you read this should have begun its roughly ten-month task.

Members of the independent panel will include internationally recognized authorities in ecology and sustainability. As its name suggests, the group will take a general systems approach to sustainable forests, considering the many inputs and outcomes and their complex interrelationships. Its focus will be on "optimal" forest practices—that is, practices that maintain forest diversity, prevent the destruction of watersheds, maintain the well-being of the communities that depend on forests, *and*

return a fair profit to their practitioners.

Key to this effort will be RMI's end-use/least-cost approach. In the case of forest products, this will mean not only developing more efficient ways of growing and using wood, but also identifying alternatives to wood-based products that perform the desired end uses more efficiently. Starting at the demand end and working upstream, the group will recommend better alternatives at each step, and ways to make them commercially more attractive than present practices.

The Systems Group on Forests will be the first project of the Future 500. A non-profit joint effort of RMI and Global Futures Foundation, Future 500 will include as its charter members the CEOs of Mitsubishi Electric America, Mitsubishi Motor Sales America, and other corporations, and in time should count scores of corporate members.

The forum's theme will be "Factor Four"—at least quadrupled efficiency in using resources across the board—and will derive its inspiration from a forthcoming RMI book that documents scores

of such industrial advances in every field from building design to paper manufacture. Members will challenge their competitors to study and implement resource productivity improvements, helping to establish efficiency as an industry norm and inefficiency as a commercial liability. The Future 500 will probably establish a system of awards to recognize exemplary achievements as firms gain practical experience, and encourage a benchmarking system for members and others to track their annual progress in raising resource productivity.

As with everything RMI does, round-table members won't be expected to do anything that isn't in their commercial self-interest, and the bottom line will be cost-effectiveness. For corporations, the advantages of efficiency should be obvious—but a little corporate peer pressure ought to help speed their enlightenment. And for society? It's been calculated that each single percentage point of U.S. and Japanese improvement in resource productivity is worth more than \$10 billion a year. That's an advantage we'd all like to

**New Staff**

*RMI's newest staff members (left to right): Wynne Foote, receptionist; Ema Tibbetts, computer/production assistant; Jan Redfern, maintenance; Jannea Moore, communications administrative assistant; and Shanley Donelan, publications assistant. (Not pictured: Lisa McManigal and Tanya Chen, green development researchers.) And a fond farewell to those who have moved on: Tee Child, Nancy Conger, and Jeanette Darnauer.*

**Can We Kenaf?**

Several readers have urged RMI to switch to non-chlorine-bleached paper for the *Newsletter*. We're hoping to go one better. We are currently seeking grant funding to enable us to switch to kenaf paper, regarded as one of the most promising alternatives to wood-based stock.

A fast-growing plant native to Australia, kenaf produces two to four times more pulp per acre than trees in the same climate. In countries with less developed wood-based paper industries, such as China, kenaf pulp is cheaper than wood pulp, but in the United States, kenaf's relative rarity makes it roughly seven times more costly than wood paper—at least for now. As has happened with recycled paper, kenaf can be expected to get much cheaper as demand increases and suppliers achieve greater economies of scale. 🌱

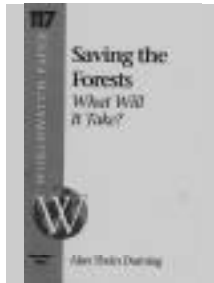
## PUT ANOTHER NEGALOG ON THE FIRE

### *Finding Common Ground on Deforestation*

The Amazonian rainforest is still burning. Old-growth trees in the Pacific Northwest are being felled for two-by-fours and chopsticks. Ten percent of the world's tropical rainforest has vanished in the past decade. This is not news. But does anybody have a clue what to do about it?

A recent crop of books and reports suggests an emerging consensus—and despite the seemingly apocalyptic dimensions of the problem, they point the way toward a more hopeful (or at least less hopeless) future for the world's forests.

Specific prescriptions vary, but the common theme is that conventional remedies aren't working because they're treating symptoms, not causes. As the Worldwatch Institute's 1993 *Saving the Forests: What Will it Take?* observes, loggers are merely "the teeth of the saw; the saw is a money economy blind to its ecological roots."



The task—and it's a big one—is to restructure an economy that currently rewards overconsumption and penalizes sustainability. Pricing reform is clearly a key step. Wood and pulp prices don't even begin to take into account the costs of lost biodiversity, soil erosion, degraded watersheds, and cultural displacement, according to *Saving the Forests*. Realigning prices with true costs would make sustainable practices competitive, increase the perceived value of forest products, and encourage greater efficiency in their production and use.

Did someone say efficiency? You bet: forest advocates are increasingly applying the same resource-efficient, end-use/least-cost thinking to forest products and their end-use services that RMI has used to transform the energy sector.

"Much as energy producers once believed their product indispensable to industrial production, most timber companies treat wood as an end in itself, and assume demand for it is bound to grow," notes *Saving the Forests*. History has proved the energy companies wrong, and demand-side management is now gospel. In the case of wood products—which, though renewable, cannot be renewed at even today's rate of consumption, and which play an active part in sustaining the planet in ways that coal and oil do not—supply-side thinking is even less conscionable.

The fact is that wood, like energy, is *not* an end in itself. As *Saving the Forests* points out, "people do not demand wood. They demand houses, tables, chairs, printed information, and other useful amenities. Wood is simply a means to an end." Recognizing this simple concept opens up a whole new world of strategies for preserving forests. Negawatts, negagallons, and negamiles are now important tools in the effort to forge a sustainable future; why not negalog?

Rainforest Action Network, an organization that has made its name conducting woodman-spare-that-tree campaigns (see cover story), is now focusing much of its effort on the demand side of the equation.

RAN's 1995 report, *Cut Waste, Not Trees*, begins with a declaration drafted last October at a RAN-sponsored gathering in Tomales Bay, California: "We call for a 75 percent reduction of wood and wood-based paper use in the United States within ten years with the expressed purpose of increasing meaningful employment, creating a healthy society, and restoring natural habitats." The report's premise is that "nearly every use to which wood is put in modern society can either be eliminated or substantially reduced" through more frugal consumption, efficiency, and the use of alternative materials.

All this should sound familiar. RMI has always maintained that if overconsumption and waste cause problems that compound each other, it follows that improving efficiency will unleash a cascade of *solutions*. RAN's paper argues that increasing wood-use efficiency can simultaneously preserve biodiversity and indigenous cultures and reduce water and air pollution. RAN's dramatic 75-percent goal, meanwhile, is the same "factor four" efficiency that RMI is popularizing in an upcoming book. It also shares the conviction that greater efficiency should imply no loss of service, may even work better, and often creates new jobs.



Given their emphasis on addressing causes rather than symptoms, recent publications on deforestation show little enthusiasm for headline-grabbing boycotts and protests. In *Saving the Forests*' analogy, blocking individual timber cuts or companies is like trying to break one tooth off a saw. A 1993 World Resources Institute report, *Surviving the Cut: Natural Forest Management in the Humid Tropics*, cautions that boycotts have questionable effectiveness, and can actually undermine sustainable forestry efforts. In *Cut Waste, Not Trees*, even RAN seems to distance itself from such tactics, acknowledging that while they may win reprieves for individual forests, they only drive logging companies to greener pastures. Much more effective, according to *Surviving the Cut*, is the burgeoning timber certification movement, which creates market value to compensate operators for logging sustainably.

Although they may not realize it yet, all parties share an interest in developing better ways of delivering the end uses now met by wood: environmentalists, who have failed to halt deforestation through other means; logging companies, who are rapidly depleting their own capital; loggers, who are in danger of putting themselves out of work; and many others who stand to profit from the development of new technologies and markets. ♻️

**HYPERCARS**

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their polymer composite bodies—would offer novel opportunities to ensure worker safety by better process design.

Although risks remain, health and safety data suggest they are lower than those for current processes involved in making steel cars, from the extraction of the raw materials to the finished product. For instance, iron and steel foundries average 27.7 work-related injuries or illnesses per 100 workers, compared to 5.5 for plastics materials and resins manufacturers.

**Recycling.** The current automobile recycling industry does a pretty good job recovering the materials from scrapped cars—over three-fourths of the weight is salvaged and reused. However, the remaining 25 percent, which is landfilled, is a heterogeneous mixture known as automobile shredder residue (ASR) or “fluff.” Fluff contains upwards of a dozen different material types and can be highly toxic; in fact, California considers it toxic waste due to its cadmium content.

Hypercars should have at least two recycling advantages over their conventional counterparts. First, the composite

materials used in a hypercar are extremely durable: composites don't rust, dent, or chip, allowing the car to be upgraded—much like a personal computer—instead of being shipped to the modern equivalent of the glue factory after ten years or so. Second, when hypercars do need to be recycled, promising new processes such as solvolysis (which chemically decomposes the composite to allow both its fiber and resin to be recovered) look cost-effective, and are already becoming commercially available.

At any rate, even if *none* of the materials in a hypercar body were recycled, the total weight of the hypercar (after removing salvageable materials such as the motor, electronics, buffer storage, etc.) would be much less than the “fluff” generated from a conventional car, and probably a lot less toxic, too. 🗑️

*A 15-page executive summary (T95-17) of Hypercars: Materials and Policy Implications is available from RMI for \$8 plus shipping and handling. Those interested in the full proprietary report should contact RMI's Hypercar Center (e-mail: hypercar@rmi.org).*

**Modeling Hypercars**

If someone made a car that got 80 mpg but was just a teensy bit less sporty than the one you now drive, would you buy it? Well, *you* might, but many Americans might not. That's why RMI researcher Timothy Moore has run the hypercar concept through months of rigorous computer modeling to find out just how its performance and safety would stack up against a typical American family car.

The basis of Moore's analysis is that the hypercar should satisfy all the criteria established by the Partnership for a New Generation of Vehicles (see page 3)—and then some. In essence, a hypercar had better be able to do everything a 1995 Ford Taurus can, and at a comparable price.

Moore's paper takes 43 very technical pages to explain its modeling assumptions and conclusions. The bottom line: hypercars are not only an effective way to achieve the PNGV goals, they're probably

the best way.

The paper promises to give hypercars a stronger foothold among automotive designers and engineers. Hypercars have received plenty of attention, but many designers still assume that their efficiency must sacrifice size, power, or affordability. Moore's modeling proves otherwise. Its across-the-board, apples-to-apples comparisons between a concept hypercar and a typical American car give the most compelling demonstration to date of hypercars' feasibility, and should galvanize key corporate players into joining the race to produce them. 🗑️

*For information on ordering "Vehicle Design Strategies to Meet and Exceed PNGV Goals" (T95-27), see p. 10. It is also available from the Society of Automotive Engineers as a paper (#951906) and as part of a book, Electric and Hybrid Vehicles: Implementation of Technologies (#1105), . (412) 776-4841.*

**Green Barracks and Negamissions**

Sometimes RMI's ideas seem to have a life of their own. Take, for example, Amory Lovins's June briefings to Navy and Marine Corps brass, highlighting opportunities for slashing energy consumption on ships and applying hypercar technology to military land vehicles.

The talk was well received, but the admirals and generals were at least as interested in green buildings as in green ships or tanks.

It turns out that the Navy, like the other branches of the armed forces, has been deferring billions of dollars' worth of construction projects ashore while it awaits final word from the Congressional base-closure commission—no point in investing money in bases that might soon be mothballed. With that uncertainty now lifted, the Navy and Marine Corps are collectively budgeting some \$6 billion over the next five years to renovate remaining bases. And inspired, perhaps, by the “greening” of the Pentagon (see the Fall/Winter 1994 *Newsletter*), they're seriously interested in resource-efficient design.

Later this summer, RMI will lead a special workshop to help redesign housing at the Navy's Norfolk, Virginia base and the Marines' Camp Pendleton in California along green lines.

Lower energy costs are just one of many payoffs for the military (and for taxpayers). Potentially more significant is the improved quality of life that green design can bring to millions of military personnel and their families, which translates into lower staff turnover and better performance.

As RMI has long stressed, one of the main benefits of resource efficiency is that it reduces the threat of conflict over things like oil—turning “Mission Impossible” into “Mission Unnecessary,” as Amory quips. But if conflict should arise, we would do well to make sure our troops are as efficient as possible, and their families secure in strong communities. 🗑️



## GREEN BUILDINGS, GREEN OFFICES

### *RMI Tackles the Multi-Tenant Dilemma*

Last October, Amory Lovins gave a keynote speech at the Urban Land Institute's annual conference calling for, among other things, a greening of the commercial real-estate industry. But not even Amory—the eternal optimist—could have predicted such a swift response.

Attending the talk was Kevork Derderian, president of Continental Offices Limited (COL), a Chicago-based firm that specializes in developing large multi-tenant office buildings for *Fortune* 500 clients. Inspired by Amory's speech, Derderian assembled around COL a consortium of building product manufacturers—including six divisions of General Electric, air-conditioning manufacturer Carrier, and Herman Miller of office-furniture fame—to test the market for green offices. In December, Derderian approached RMI to help coordinate the effort.

For the corporate partners, green office buildings are a potentially lucrative new market niche which, naturally, they want to corner with a line of innovative products and services. For RMI, the venture is an opportunity to harness the profit motive of others to move green design into the corporate mainstream.

It's also a chance to learn what works, and at what cost, in the multi-tenant office environment—a huge but hitherto problematic area for green designers.

Green design is all about integrating systems from the get-go. But the developer of a multi-tenant building really only has control over the shell; the tenants will dictate nearly everything about the *inside* of the building, including where many of the walls will go. Without knowing where the walls will go, it's tough to optimize daylighting and design an efficient lighting system to dovetail with it. Without knowing the lighting and plug loads—the demand for electricity through sockets—it's risky to downsize the cooling system, normally a big payoff of green design.



*Continental Towers, Chicago: The consortium hopes to design a fourth building that's at least 50 percent more efficient than its neighbors.*

It's often possible to bring a single, known tenant into the design process early enough to achieve real integration. But the developer building on spec—which is usually the case with multi-tenant offices—is apt to have a hard time explaining such niceties to prospective renters armed with rigid (and obsolete) rules of thumb about lighting or plug loads.

The multi-tenant dilemma is just one of several institutional barriers that RMI's Green Development Services has been eyeing for the past couple of years, and participating in the COL consortium finally gives the team a crack at tackling them in the flesh. The first test will be a 300,000-square-foot, ten-story building in Chicago, one of a complex of four identical structures. Despite a fairly good initial design and the special difficulties of multi-tenant occupancy, energy modeling suggests it can run 50–60 percent more efficiently than the other three—even 75 if we really pulled out all the stops.

In a related development, RMI is working on another institutional barrier to green offices: how to reconcile the interests of commercial tenants (who have little incentive to improve the efficiency of buildings they don't own) and landlords (who have no incentive to save energy

paid for by tenants).

RMI has contracted with an attorney to craft new leasing language that encourages both parties to share the costs and the benefits of energy-efficiency measures. An odd route to efficiency, perhaps, but as every green designer knows, the devil is in the details. ☛

#### White House CD-ROM

At the time of writing, a CD-ROM based on the RMI-led "Greening of the White House" was finished but a release date had not been set, according to the American Institute of Architects, which is coordinating the project. When it's ready, copies will be available through RMI. For an update on the release, call Lydia Ford at the AIA at (202) 626-7360.

#### Annual Report

RMI's *1994 Annual Report* is now available. It highlights the Institute's work during 1994, describes the special niche we fill in the nonprofit world, and summarizes our finances. If you would like a copy, please write or call Ross Jacobs in Development.

# HOT OFF THE PRESS

## *RMI's Publications Department Is on a Roll*

### *New Publications*

#### **ENERGY**

**E95-23.** *The Energy Directory Kit.* Everything you need to publish your own local directory (see article, page 5). When ordering, please specify word-processing software, operating system, and diskette size. \$99.00

**U95-24.** "Retail Wheeling and Utility Decentralization." Letter in *Technology Review* on proposals to restructure the utility industry. 2 pp, \$1.50

#### **TRANSPORTATION**

**T95-17.** "Hypercars: Materials and Policy Implications." Executive summary of a proprietary research report (see article, page 3). 15 pp, \$8

**T95-19.** "Hypercars: The Next Industrial Revolution." Semi-technical "storyboard" on key concepts and data. (Replaces T93-16.) 20 pp, \$10

**T95-27.** "Vehicle Design Strategies to Meet and Exceed PNGV Goals." Society of Automotive Engineers technical report (see article, page 8). 43 pp, \$10

#### **SECURITY**

**S95-20.** "Nuclear Power and Proliferation." Letter in *The Wall Street Journal* 1 p, \$1.50

**S95-21.** "Nonproliferation: Now a Workable Idea." Why changing conditions can finally make the Nuclear Nonproliferation Treaty work (see article, page 4). 1 p, \$1.50

**S95-25.** "Negawatts and Hypercars: How the Resource Efficiency Revolution will Transform the Navy." Summary of an address to U.S. Navy leaders. 6 pp, \$3.00

#### **GENERAL**

**G95-22.** "Reduce, Reuse, and Then Recycle." Factsheet on waste reduction and recycling programs. 2 pp, \$1.50

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The price of "Greening the Building and the Bottom Line: Increasing Productivity Through Energy-Efficient Design" (D94-27) has increased to \$12.00; the original price was miscalculated. (Those of you who got the paper for \$5.00 have already made a 140 percent return on your investment!)

### *Coming: The RMI Catalog!*

Ordering RMI books, papers, and other merchandise is about to get a whole lot easier. The first-ever *RMI Catalog* will be available in September, and it's free.

Out goes RMI's overcrowded old "publications list," which gave everyone (including us!) headaches. In comes an up-to-date, easy-to-navigate catalog that organizes the Institute's 200-odd publications into sensible categories and gives helpful summaries of each. Also sold through the catalog will be RMI T-shirts, caps, and posters.

To request your free catalog, simply tear off (or copy) the back page of this newsletter containing your address label, check the box indicating you'd like a catalog, and mail it to RMI's Publications Department. If there is no address label, or if any information on the label is incorrect, please help us update our files by writing in the correct information. ☺

### *Shipping & Handling*

RMI is changing the way it charges for shipping and handling on publications orders. Currently, books carry a 20-percent charge, while shipping and handling is free for all other publications. To distribute costs more fairly, the charges listed in the table below will apply to all orders, effective August 1.

<b>Order Amount</b>	<b>U.S.</b>	<b>Canada</b>
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50.01-100.00	7.00	9.00

For charges on orders over \$100, express delivery, or shipments outside the United States and Canada, please call, fax, or e-mail RMI's Publications Department. All charges are in U.S. currency.



*Publications coordinator Lysa Usher has spent this summer neck-deep in order forms, thanks to tremendous demand for RMI's new books. We appreciate your interest, everyone, and keep those orders coming! (Don't worry about Lysa—we shovel out a path so she can go home at night.)*

## FLUSH WITH SUCCESS

### *In Thailand, Efficient Toilets Are a Sign of Affluence*

*Former RMI water researcher Andrew Jones, who wrote about water efficiency in Thailand for the Spring 1994 Newsletter, filed this update after a recent return trip:*

Car travelers in Bangkok have plenty of time to read the billboards. Stuck in traffic, I examine the colossal offerings: palatial homes in suburban developments, fax machines, karaoke halls, whiskey. These are products for an exponentially growing class of urbanites with money to spare, the beneficiaries of the sustained eight-percent annual economic growth that has launched Thailand out of the category of "developing nations."

But today I see an unlikely display: a billboard picturing a 100-foot-tall toilet with four one-liter bottles of mineral water stacked on its shiny white seat. *Anurak naam*—"saving water"—it announces, for the toilet will flush with four liters (about one gallon), instead of the 14-liter (four-gallon) models I usually see. (RMI's 40,000-odd visitors have used a 3.8-liter toilet since 1984.)

It is the billboard of my dreams—two dreams, actually. First, that environmental conservation will accompany economic growth—that millions of recently moneyed Thais will buy efficient technologies at the same time they buy their first VCR or car.

At the same time as many city-dwellers are buying their first or second car, people have been deciding not to have their third, fourth, fifth, and sixth children. Between 1960 and 1994, the average number of births per woman has dropped from 6.0 to 2.1. Among other factors, credit aggressive family planning, female health programs, and an educational system that has raised female literacy to 90 percent.

My second dream is that the Bangkok water managers will start considering reducing demand for water instead of continually expanding the supply. But the supply-expansion ethic of this kingdom runs deep, as it does in most countries. The 1,000-baht bill, the highest denomi-

nation, pictures the king and queen holding engineering plans for a new dam.

The billboard has recharged my optimism. Last year, when Dr. Chirapol Sintunawa, of the Thai environmental organization ADEQ, and I drove around Bangkok proclaiming the ways that saving water could alleviate the pressures of a particularly dry season, the country's two toilet manufacturers exported almost all their water-saving toilets to Singapore, Europe, and the USA. We wrote editorials, educated journalists, pleaded with water managers. Chirapol drove through nine provinces with two of the precious non-exported toilets in the back of his pickup, giving speeches.

And now they're on billboards, pitched as a luxury item, competing for attention with home electronics and suburban palaces. More slow but steady change in a country that can increasingly afford to use its resources wisely—and still can't afford not to. 🌐

## INSTITUTE SUPPORTERS

Our sincere appreciation is offered to these friends who have contributed to RMI's support between 1 January and 30 April 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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