



RMI *Solutions*

NEWSLETTER

Big and Green

RMI IS HELPING BIG PROJECTS GO GREEN

By William D. Browning, Hon. AIA,
and Cameron M. Burns

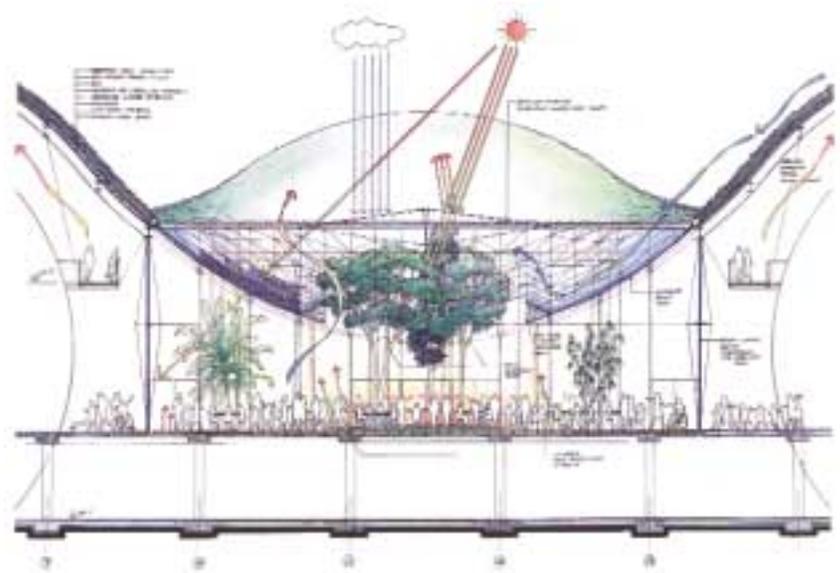
Rocky Mountain Institute has been deeply involved in green building (both influencing it and promoting it) for twelve years. In recent years, our work with large buildings has become both more frequent and more important — for good reason. When done green, big projects exponentially multiply the benefits that green buildings typically produce.

From schools to factories to offices to institutional facilities, properly designed and crafted big buildings can stem the so-called exodus to the suburbs, lure even the most uninquisitive into rich learning environments, and heal mental and physical ailments without a single doctor's appointment (or bill). Better yet, these buildings incur smaller utility costs and keep investments firm.

It's somewhat disconcerting to think that we learned all this during the twentieth century,

Renzo Piano's design for the California Academy of Sciences' new facility is an example of a large structure using green building strategies and letting those strategies dictate form. The "living roof" (below) will be covered with more than two and a half acres of native plant species.

Drawing courtesy Renzo Piano Building Workshop



then promptly forgot what we knew. Now it's time to relearn it.

CONTINUED ON NEXT PAGE

Big and Green. RMI has worked on some very big, very green buildings. Here we explain why bigger is not always worse for sustainable architecture (p. 1).

Enlightening Blackouts. The 14 August blackout in the Northeast was entirely predictable. RMI's Amory Lovins, Kyle Datta, and Joel Swisher comment on why, and offer common-sense ideas for fixing the problems (p. 5).

Ecology is Free. A few years ago, STMicroelectronics, one of the world's biggest chipmakers, hired RMI to help reduce its consumption of energy and resources. Here, former RMIte and consultant Chris Lotspeich updates us on millions of saved dollars and how RMI and ST found them (p. 7).

V is for Very Cool. How many city plans consider climate change? Vancouver's new long-range plan does, making it unique in the world. Here, RMI's Michael Kinsley gives readers a look at what the document says (p. 10).

Islands and Islanding. BC Hydro is looking for ways to meet Vancouver Island's growing energy needs. In July, RMI helped the utility explore ideas to address the long-term energy needs of this large, beautiful, and renewables-rich place (p. 12).

Greening the Grocer. RMI and Supervalu, the eleventh largest supermarket retailer in the United States, recently took a look at how supermarkets can freshen up their efficiency (p. 14).

Other Voices. Pat Kociolek of the California Academy of Sciences describes the public's desire for scientific knowledge and how his organization's big new green building will help (p. 19).



(See p. 24)

What's Inside...

A Little Background

Before the invention of big-building mechanical systems, access to light and air were among the most important design considerations for large structures. While the big buildings of the late nineteenth and early twentieth centuries were often heated with steam, they were just as often passively cooled and illuminated, using deep-set windows, retractable canvas awnings, thermally-absorbent stone, and other, now-forgotten passive-comfort tricks. After World War II, however, as buildings' mechanical systems evolved and the International Style came to dominate architecture, access to light and air became end-of-design-process afterthoughts. With unlimited ducts, fans, pumps, and electricity, any building's light, temperature, and humidity could be dragged into a habitable range.

As Bill McDonough observes in *Big & Green: Toward Sustainable Architecture in the 21st Century*,

“As the twentieth century came to a close, most new buildings had become so divorced from their surroundings that the *Wall Street Journal* devoted an entire front page feature to a new office building designed by my firm because it had windows that could actually be opened. When operable windows make news for setting a design standard, we have reached an astonishingly low point in architecture.”

“Green” elements, such as daylighting, natural ventilation, and alternative energy and wastewater systems, meanwhile found their niche in small structures, and it was here that designers crafted personalized and very livable spaces. As anyone who grew up with *Mother Earth News* can recall, funky homes with solar collectors, wind turbines, and water recycling systems were commonplace in the early 1970s.

In 1973, the environmental movement of the late 1960s and '70s crashed headlong into the Arab oil

embargo and America suddenly had an “energy crisis.” The energy crisis was most noticeable in the way it affected transportation energy, but it also made an impression on the building industry, and the notion that fossil fuels could indefinitely power large space-conditioning systems was suddenly challenged.

“In Europe, where the price of energy was even higher, governments encouraged architects, engineers, and builders to develop strategies to naturally illuminate, ventilate, and supply power to buildings,” wrote David Gissen, a curator for the “Big & Green” show at the National Building Museum in Washington DC.

In the United States, the general environmental movement of the 1970s didn't catch on immediately, and floundered well into the 1980s. As James Wines noted in *Green Architecture*, “exploitative politics of ‘supply side’ economics and its recklessly self-serving environmental policies” dominated social and political life, and it took several environmental

RMI *in the news*

RMI's Huston Eubank Named Secretary of World Green Building Council



Huston Eubank, AIA, of RMI's **Green Development Services (GDS)**, has been named secretary of the World Green Building Council (WSGBC), a global federation of green building councils modeled after the decade-old U.S. Green Building Council (USGBC).

The mission of the WGBC is “to establish a common framework and principles for the formation of councils around the world, serve as a global voice on behalf of GBC members, support and promote individual GBCs, establish a clearing house for knowledge transfer in cooperation with the **International Initiative for Sustainable Built Environment (iISBE)**, and encourage the development of national green building rating systems.”

Huston has long been interested in international projects. Since non-American building projects offer U.S. designers both important cultural lessons and location-specific building solutions, the assignment suits him perfectly.

The nine member nations of the new World Green Building Council are the United States, Australia, Spain, Canada, India, Japan, Korea, Mexico, and Brazil. The WGBC was formed in 1999; in November 2002, delegates from the member nations met prior to the USGBC's annual conference in Austin and ratified the new organization's formal constitution.

“I'm thrilled to have Huston's vision, commitment and enthusiasm,” said **Rick Fedrizzi**, the organization's president. “Rocky Mountain Institute was with us from day one, and we feel honored to have RMI assisting our efforts.”

disasters in the late 1980s and early 1990s to bring resource issues back to center stage. As many citizens of the world are now witnessing environmental calamity on at least an annual basis, how humans treat the world will probably remain a prominent topic.

“Since the journey into space, the fragility of the world has both shocked and challenged,” wrote Brenda and Robert Vale in their 1991 book *Green Architecture*. “It has become apparent how dependent each person is on the planet, for all belong to the same whole. The single shared experience is that of living on the same, very small, earth. The way in which one person makes an alteration to the planet must have an effect on the other 4,999,999,999 inhabitants.”

Today, a billion people later, “large” architecture is becoming — often out of necessity — green architecture. Many of the green buildings that exist, including products that have achieved a high U.S. Green Building Council LEED rating, are more or less conventional buildings that have been techno-fixed with green technologies. These buildings do have significantly better environmental performance than conventional projects, but we should take the next step. RMI’s GDS team (Bill Browning, Huston Eubank, Alexis Karolides, and Jenifer Seal) has

Today, “large” architecture is becoming — often out of necessity — green architecture.

been fortunate to be involved in several projects where the environmental performance of the building is largely a result of the fundamental design decisions, examples of which are outlined below. In each of these projects, the building’s form, skin, and systems are inseparable from its environmental performance goals.

How Is Bigger Better?

To the casual observer, big buildings seem the antithesis of energy- and resource-efficient design, but that is not necessarily the case. First, because of the concentration of users, the per-capita energy and resource efficiency, during both construction and operation, is much higher than in most other types of structures.

Second, the urban location is important. These buildings are in places where most occupants will arrive by mass transit or on foot.

Third, and less obvious, is the simple fact that large buildings have big budgets, and big budgets often allow developers, architects, and engineers

to push their creativity and try things that wouldn’t dare be considered with smaller projects and smaller budgets — photovoltaics (PVs) in the building’s skin, for example, or wind turbines on the roof, or fuel cells near the electricity’s users. These big buildings are important economic engines in two important ways: a) they can enlarge demand for green technologies, thereby expanding production capabilities and lowering the price of PVs, turbines, special glazings, etc. (one large green building project, currently on hold, would have required the building of a small industrial facility to manufacture these devices), and, b) although this is not necessarily a quality of green buildings only, they will have huge impacts on their cities’ economies. For example, when the World Trade Center was attacked and destroyed, Manhattan lost thirteen million square feet of office space, an area equal to roughly two-thirds the total office space in downtown San Francisco.

Certainly big buildings, green and otherwise, can cast huge shadows and create strange wind patterns — two things the WTC did — but there are some compelling reasons to push

David Lawrence Convention Center,
Pittsburgh, Pa (see p. 30).

Photo courtesy Green Building Alliance



Big and Green: Projects

these buildings as far as possible toward sustainable design. RMI has long advocated smaller, decentralized systems — notably with energy and water devices and systems — but when it comes to green buildings, bigger does not always mean worse.

One Bryant Park

Location: 42nd Ave. and Sixth St., New York

Architect: Cook + Fox

Size: 2.1 million square feet

Year: Being designed in autumn 2003.

Client: Durst Organization

Description/what's special:

The developer is exploring a partial double-skin building design (walls with space between them, often done in Europe), which can be very expen-

sive. If done properly, heating and cooling energy savings can be, in the words of RMI's Bill Browning, "enormous." Raised floors, day-lighting systems, onsite power generation, sophisticated water efficiency, and highly efficient mechanical systems are also components under strong consideration.

Unique challenges: Speculative building; however, the developer (who also did the Condé Nast building at 4 Times Square) is well-versed in green building issues and opportunities and is requiring even better energy and resource efficiency performance than 4 Times Square achieved.

RMI's involvement: RMI worked with Bob Fox, now a partner at Cook + Fox, and the Durst Organization on 4 Times Square and will help guide sustainability here. RMI led a charrette with the design team and the major tenant regarding high-performance data centers for trading floors.

Peking University, College of Environmental Sciences

Location: Beijing

Architect: Anthony Ng and Prof. Young Ho Chang

Size: 250,000 square feet

Year: Construction hoped to start in 2004.

Client: College of Environmental Sciences

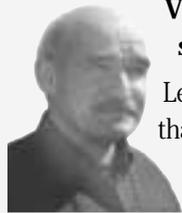
Description/what's special:

A broad mixture of disciplines will go under one roof. There'll be architectural and landscape architecture studios, global information systems areas, wetlabs, an atmospheric research department — you name it. A design charrette was held in September 2003. In fast-developing China, this building could help point the way to cleaner skies and better designs — because, best of all, it's dedicated to teaching the nation's future leaders.

CONTINUED ON PAGE 30

RMI *in the news*

Retired U.S. Navy Vice Admiral McGinn Joins RMI



Vice Admiral Dennis V. McGinn (USN Ret.) recently joined RMI as a **senior fellow in international security**. He is working with RMI CEO Amory Lovins and other policy experts on security issues.

Lecturing at the Naval War College around 1991, Amory was struck by the young Captain McGinn's remark that aircraft carriers get the equivalent of about seventeen feet per gallon, and intrigued by his invitation to help the Navy improve its fuel efficiency. A decade later, as Commander of the 120,000-person Third Fleet,

Vice Admiral McGinn could make it happen: at the request of the Secretary of the Navy, Denny hosted RMI's exploration of the scope to save energy aboard a typical surface combatant (see *RMI Solutions*, Fall 2001), with far-reaching implications for RMI's effort to help the Pentagon shed its unwanted title as the world's largest user of oil.

Before retiring as a three-star general from the U.S. Navy on 1 October 2002, Denny was Deputy Chief of Naval Operations for Warfare Requirements and Programs. His team of more than 700 developed, integrated, and prioritized long-term plans and a budget of \$63 billion per year, implemented through more than 450 complex programs involving ten headquarters divisions and thirty-four field organizations.

In a distinguished thirty-five-year military career, Denny has been a naval aviator, a test pilot, and a national security strategist; held numerous command billets; Chief of Information Systems and Chief Negotiator, Allied Command Europe Restructuring, at Supreme Headquarters Allied Powers, Europe; directed Naval Aviation Warfare (responsible for over 120 high-tech programs costing \$18 billion a year); and led the organization, training, and risk management of over 180 diverse and dispersed Naval and aviation units.

A graduate of the U.S. Naval Academy in naval engineering (1967), the Navy's Test Pilot Program, and the International Security Program at Harvard's Kennedy School, Denny has served as a Strategic Studies Fellow in the Naval War College and as Chairman of the U.S. Naval Institute. He holds the Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit (four awards), Distinguished Flying Cross, Meritorious Service Medal, and Strike Flight Air Medal.

In recent years, he has pioneered the introduction of network-centric warfare concepts to operating forces, led other key elements of military transformation, and helped to integrate humanitarian relief efforts into military planning and practice.

Denny and his wife Kelly reside near Washington DC.

Enlightening Blackouts

By Amory B. Lovins,
E. Kyle Datta,
and Joel N. Swisher, PE

We told you so.

There, we said it. RMI's 1981 study for the Pentagon, *Brittle Power: Energy Strategy for National Security* (www.rmi.org/sitepages/pid533.php), explained why mishap or malice regularly crash the electricity system — and how an efficient, diverse, dispersed, and more-renewable system could be crash-proof and cheaper. Twenty-two years later, the power grid, our nation's most complex and critical infrastructure, remains profoundly vulnerable. Neither more studies nor more blackouts have changed what's built. Disaster remains the grid's unswerving destination.

The lights went out because they never went on in the heads of the electricity system's architects, who expertly pursued flawed policy and technical goals — causing the 14 August 2003 blackout, its predecessors, and (if nothing changes) its successors. Carefully orchestrated House and Senate hearings have just reinforced this misconceived agenda.

The problem is overconcentration. America's three major electric grids (roughly speaking East, West, and Texas) rely on aerial arteries and precise electronic signals to keep huge machines rotating in exact synchrony. Vast grids linking giant plants can more evenly share cheap electricity, but they also make the grid less stable in new ways and over wider areas. Misplaced rules and rewards for

transmission have delayed modernizing with fast solid-state switches and other devices (which can also raise power lines' capacity), enticing catastrophe. Restructured electric markets challenge this constrained system with transmission transactions of a frequency and complexity for which the grid was not designed.

After the 1965 and 1977 blackouts, utilities built more and heftier wires,



Satellite images showing the Northeastern US and Eastern Canada twenty hours before the blackout (top) and seven hours after the blackout (bottom).

Photos: courtesy Air Force Weather Agency (AFWA)



which, far from preventing cascading failure, made it more widespread and frequent. Adding wires is as misguided (in one utility executive's words) as "prescribing bloodletting for a

patient with a high fever. It reflects a fundamental misunderstanding of what is amiss." Building more power lines is also slower and costlier than three other ways to do the same thing: using electricity efficiently, letting customers respond to price or scarcity, and making power where the customers are.

The fastest and cheapest option is using electricity very efficiently, so we needn't make and transmit so much of it to produce hot showers and cold beer. But electricity is usually mispriced, and forty-eight states reward distribution utilities for selling more electricity and penalize them for cutting customers' bills. In 1989, state utility regulators nationwide unanimously voted for reform, but only California and Oregon actually have smart incentives today, with California having restored them after its disastrous 2000–01 digression. These incentives work. California's per-capita use of electricity has been flat during twenty-seven years of generally robust economic growth, while per-capita use grew by half in the other forty-nine states. California now wrings 14 percent greater productivity from its electricity — half via efficiency standards that prompted national standards saving 40 billion watts (40 GW) in refrigerator/freezers and 135 GW in air conditioners, vs. the 61 GW lost in the blackout.

A second key option is signaling customers when power is scarce, so they can choose convenient ways to trim or defer power use. New "smart meters" can make such "demand response" pay in homes and businesses alike. It's widely done in some

Enlightening Blackouts

Letting all options compete fairly — all ways to make or save electricity, no matter what size or kind they are or who owns them — would reshape the grid into an architecture as resilient as the Internet.

states and countries but underused in most of the United States. Both load management and efficient use of electricity free up transmission capacity without building new lines. Some experts expect investigation to reveal that just a few hundred megawatts of timely, well-placed load management, plus properly working switches, could probably have blocked the blackout.

Such demand response also dampens price spikes when power is scarce, and provides cheap insurance against artificial scarcity. Had California installed extra load management, equivalent to 1 percent of its peak load, shrewd investors could simply have shorted the power market (bet on lower prices) in 2000–01 when suppliers were withholding supply to raise prices — then activated their load management, dropped prices, averted shortages, and taken more than \$1 billion from the miscreants.

Moreover, almost all peak power is made by inefficient gas-fired combustion turbines, so shaving just 5 percent of U.S. peak electric load would save 9.5 percent of total U.S. natural gas use — enough to return gas prices to their previous normal range for years. (That'd save customers about \$40 billion a year, plus power-cost reductions estimated by McKinsey & Co. at \$15 billion a year.) And both demand response and efficient use can be fast. Two decades ago, the ten million people served by Southern California Edison Company were cutting its forecasted peak demand by 8.5 percent *every year*. This cost the utility about 1 percent as much

as new supply. Today's technologies and delivery methods are far better.

The third key option is decentralized or "distributed" generation. Why did the Manhattan skyline show islands of light twinkling through the darkness? Because some local "micropower" generators were designed and allowed to isolate from the collapsing grid and keep serving their local loads. A new engineering standard for safely "islanding" should be adopted nationwide: interconnecting local generators with the grid should require compliance with that standard (IEEE 1547), UL approvals, local building codes, and nothing else.

Tangled and discriminatory rules hinder decentralized generation. A megawatt generated where it's needed is far more reliable than a megawatt generated far away, but is rarely paid for this considerable value. The Federal Energy Regulatory Commission doesn't yet let demand-side or distributed-generation solutions compete on an equal basis with transmission upgrades, nor can efficient use and load management compete with generation in most wholesale markets. States that upgrade transmission can cost-share with neighboring states, but those buying cheaper alternatives must pay the whole cost themselves.

States should also let decentralized generators compete widely and fairly. Certain types of small, onsite generators should be able to sell power back at the same tariff customers pay (a dozen states don't yet allow such "net metering," and many others' asymmetrical rules penalize micropower). And states should abolish excessive fixed charges and anticompetitive exit fees.

From about 1880 to 1980, power stations were less reliable than the grid.

Ever larger units backed each other up on ever larger grids. Today, delivering the most reliable and affordable power requires making it at or near the customers, because new generators have become cheaper and more reliable than new transmission and distribution, making new power lines less competitive and less necessary.

Despite all the obstacles, micropower is growing rapidly — partly because, as RMI's *Economist* Book of the Year (www.smallisprofitable.org) explains, its 207 hidden economic benefits often boost value by about tenfold. Yet the whole public policy framework still favors big plants and transmission lines — electricity's last bastion of central planning — and shields both from real competition. Proposals for federally mandated and subsidized powerline construction would if anything exacerbate this problem. And building more and bigger power lines will ultimately cause more and bigger blackouts.

Letting all options compete fairly — all ways to make or save electricity, no matter what size or kind they are or who owns them — would reshape the grid into an architecture as resilient as the Internet. This would make sense, make money, and make major failures nearly impossible by design.

The problem isn't too few power lines; it's rules that reward expensive expansion of a grid inherently vulnerable to devastating failure and hence an attractive target for terrorists. We can't afford to hit the snooze button again and doze through this latest wakeup call.

Amory Lovins is CEO, Kyle Datta is Managing Director (and former leader of Booz Allen & Hamilton's U.S. utilities practice), and Dr. Swisher is Energy & Resources team leader at RMI (www.rmi.org).

Ecology is Free

RMI'S WORK WITH ST MICROELECTRONICS

Photos and story
by Chris Lotspeich

Many of the attributes of a successful business are also useful for tackling environmental challenges: visionary leaders, empowered employees, innovation, efficiency, continuous improvement, and market leadership. It should thus be no surprise that STMicroelectronics (ST), a leading high-tech company, is also a pioneer of sustainable commerce. RMI is pleased to have contributed to ST's award-winning accomplishments.

ST is one of the world's top five microchip manufacturers, with over \$6 billion in revenues and 43,000 employees in thirty-one countries at seventeen manufacturing sites and other corporate facilities. CEO Pasquale Pistorio champions **total quality management (TQM)**, emphasizing measurement and continuous improvement to boost yield and minimize waste. The Decalogue, ST's "ten commandments" of environmental performance, specifies goals for saving energy and water, reducing greenhouse gases, and other objectives. Pistorio says environmental management "is not an expensive luxury, but an economic advantage. To paraphrase a well-known statement, we believe 'ecology is free'."

Microchip Manufacturing

Microchip fabrication facilities (or "fabs") are complex and energy-intensive. Chips are made on silicon wafers in high-tech devices called "tools," which operate inside climate-controlled "clean rooms." Chip manu-

facturing is very sensitive to disruption and contamination. Production stoppages can cost more than \$1 million per day.

Fabs have extensive heating, ventilating, and air conditioning (HVAC) systems with high-performance filters to maintain clean rooms' temperature and humidity very precisely while limiting airborne particles. Fans, pumps, furnaces, and chillers deliver conditioned air and cooling water into the clean room via ducts and pipes. Depending on their size, fabs use from 3 megawatts to as much as 15 megawatts of power. HVAC systems consume 30–50 percent of a fab's electricity; tools use another 40 percent or so. Energy accounts for less than 2 percent of a chip's cost, yet electricity can be the largest single operating expense for a chipmaker, totaling millions of dollars annually at a single fab. Moreover, energy-saving measures can improve key operating parameters (yield, setup time, flexibility), and in new plants can save capital and construction time — critical factors in competitiveness.

Despite great innovation, semiconductor manufacturing fosters a risk-averse corporate culture due to exacting process requirements, safety risks, the high cost of downtime, and brutal competition in a fast-moving marketplace. (Not surprisingly, Intel CEO Andy Grove's book was titled *Only The Paranoid Survive*.) Meeting production and time-to-market targets requires extraordinary control over thousands of variables. When something works, it is copied exactly. Firms also "copy exactly" previous fabs when building new ones. This

saves some time and initial cost, yet retards improvements outside the clean room,

including energy efficiency features — thus raising operating costs. It's somewhat ironic that cutting-edge technologies are made in buildings designed decades ago, and thus those buildings now offer significant energy- and money-saving potential.



RMI's work with ST

In the mid-1990s, Amory Lovins's longtime friend and mentor **Lee Eng Lock** helped to make ST's Singapore fab the most energy-efficient in the industry. Energy costs per silicon wafer were reduced by 60 percent with a compact, multilevel fab design as well as retrofit projects, 80 percent of which paid for themselves within eighteen months. Mr. Lee then gave Lovins's book *Factor Four* to ST's Vlatko Zagar. He shared it with Vice President of Total Quality and Environmental Management (TQEM) Murray Duffin, who asked RMI to work with ST. I was then an RMI senior associate and Amory's executive assistant, and was fortunate to lead our consulting with ST.

During 1998–2000, Amory and I led energy efficiency surveys at eight fabs in Europe and the United States. Our team included Mr. Lee, Ron Perkins, and Peter Rumsey from Supersymmetry; consultant Chris Robertson; and E SOURCE's Jay Stein. ST's Vlatko Zagar and Eugenio

"We are strongly motivated by a spirit of 'constructive dissatisfaction,' and we cannot be complacent."

Pasquale Pistorio, CEO, STMicroelectronics



Ferro traveled with us. Some of our recommendations were tried during our surveys and yielded immediate benefits, prompting then-TQEM Director Georges Auguste to call RMI's first visit "very successful and quite profitable."

We trained ST staff and helped Zagar develop an energy efficiency manual. Robertson contributed to our training and consulting efforts on distributed generation, energy-saving technologies, and "green tools" initiatives. Lee's Singapore office also worked at ST's Asian facilities.

Typically we identified potential HVAC energy savings of 30–50 percent, plus other efficiency opportunities. Collectively these retrofits had payback periods of less than two years. Generally we ignored tools and worked outside the clean rooms in order to avoid concerns about any interference with production.

Significant energy and water efficiency potential also exists in the manufacturing process, which ST has begun to explore.

Our recommendations included slowing fans and pumps while maintaining flow with low-friction ducts and pipes. Halving air velocity reduces fan energy by nearly seven-eighths. Control networks with performance sensors and motors with variable-speed drives enable HVAC systems to do only as much work as is needed at each moment. "Free cooling" can be provided by cool outside air or, in low-humidity conditions, by running more cooling towers at lower fan speeds. The free cooling system at ST's fab near Milan costs 80 percent less to operate than conventional cooling, saving \$500,000 annually with a payback of one to three years, depending on the weather.

Results

Since the mid-1990s, ST has steadily reduced its resource intensity while rising from outside the ranks of the top ten chipmakers to become one of the five biggest in revenue. From 1994 to 1997, ST exceeded its Decalogue goal of reducing energy use annually by 5 percent per million dollars of added value. After the first year of work with RMI in 1998, ST had reduced energy consumption by 17 percent and CO₂ emissions by 20 percent relative to the 1994 baseline.

In 1999 RMI evaluated two fabs' implementation of our recommendations. In one year, mechanical utilities energy use decreased by 5–10 percent overall, and fell by as much as 40 percent in air and water handling. Savings equaled 2–4 percent of total site energy use, even though the manufacturing process was excluded. ST's worldwide energy intensity fell 26 percent from 1994 to 1999.

RMI *in the news*

'Data Hound' Koomey Joins RMI as Senior Fellow



Jonathan Koomey, Ph.D., a staff scientist currently on leave from Lawrence Berkeley National Laboratory, where he led end-use research, has joined RMI as a senior fellow. A self-described "data hound," Jon contributed to the RMI **High-Performance Data Center charrette**; he is among the nation's leading authorities on how energy is used, particularly by data equipment, and led the debunking of Mark Mills's urban legend about the supposedly high energy demands of the Internet (see *RMI Solutions*, Spring 2003). Jon is a key member of RMI's team preparing ***Out of the Oil Box: A Roadmap for U.S.***

Mobilization, a major synthesis for business and military leaders. Jon will be the MAP/Ming visiting professor in energy and environment at Stanford for the 2003–2004 school year (a position held last year by RMI's Dr. Joel Swisher, PE). He has authored or coauthored seven books and more than 130 reports and articles on energy policy, energy economics, and climate change. His most recent book is *Turning Numbers Into Knowledge: Mastering the Art of Problem Solving* (www.numbersintoknowledge.com, Analytic Press, Oakland, Calif., 2001, also available from www.rmi.org), which helps readers hone their critical thinking and numeracy skills. Amory Lovins commented: "This splendidly clear and concise introduction to the craft should be a foundation of every student's apprenticeship — and for those who missed it, a toolkit for a salutary retrofit later. How much more quickly and pleasantly we would discover truth if everyone followed these simple precepts!"

Despite the 2001 market downturn, energy efficiency per unit of production improved 15 percent from 2001 to 2002. Electricity use per wafer went down by about one-third during 1994–2002, while electricity per pin (the external lead connection on a finished product) fell 40–50 percent below 1994 levels.

Energy efficiency added \$60 million of profit between 1994 and 2001. No energy efficiency investment has taken longer than three years to pay back, and collectively these measures have yielded an average payback of two years. A 2001 company-wide survey identified 350 energy efficiency actions to be implemented by 2004 with projected annual savings of over \$11 million.



STMicroelectronics's Richard Pieranunzi, Alain Brochet, Laurent Bosson, and Pasquale Pistorio; RMI's Amory Lovins; and Chris Lotspeich (l-r).

ST's Goal: Zero Net CO₂ Emissions by 2010

ST believes climate change is “the most pressing environmental threat.” Lovins contributed to Duffin’s and Pistorio’s comprehensive climate strategy, which included production improvements, energy efficiency, cleaner power, and carbon offsets. Based on these efforts, in 1999 ST set a goal of *zero* net CO₂ emissions by 2010 — when ST expects to be making forty times as many chips as it did in 1990.

By 2010, ST’s electricity is to come 65 percent from alternative sources such as fuel cells and cogeneration, 30 percent from conventional sources, and 5 percent from renewables.

This would reduce CO₂ emissions per million dollars of added value by more than 80 percent from 1990. ST forecasts total savings of over 10 million metric tons of CO₂ and \$900 million of energy during 1994–2010. ST has photovoltaics on buildings in the United States and

France, and is adding to its suppliers a combined heat and power plant in Sicily and a 10.5-megawatt wind farm in France. ST will offset remaining CO₂ emissions with reforestation and other activities, including 3,000 hectares of trees planted by 2003. In 2002’s down market, ST’s environmental investments were 1.29 percent of its total investments — and, since 2000, boasted a nearly 50 percent return. Since 1994, the fraction of waste sent to landfill fell from 70 percent to 15 percent;

“The best way to predict the future is to invent it.”

Alan Kay, computer pioneer

the recycled fraction rose from 25 percent to 60 percent; and water consumption fell 33 percent, saving \$70 million.

Conclusion

The RMI team’s relationship with ST continues. ST researchers supported the Hypercar® project, in which Pistorio also invested personally. Mr. Lee participated in the 2001 global energy survey. Peter Rumsey worked on ST’s U.S. fabs, and designed an award-winning ventilation system for a Phoenix clean room that reduced energy consumption by 75 percent.

ST says its “ecological commitment [is] not only for ethical and social reasons, but also for financial return, and the ability to attract the most responsible and high performing people.”

“Our ‘ecological vision’ is to become a corporation that closely approaches environmental neutrality.” Pistorio adds “Nevertheless, we are strongly motivated by a spirit of ‘constructive dissatisfaction,’ and we cannot be complacent. There is much more to do and we are still far from meeting the needs of today without compromising the ability of future generations to meet their own needs.”

Computing pioneer Alan Kay is credited with the saying: “The best way to predict the future is to invent it.” With a little help from RMI, Pistorio and his colleagues at ST are doing just that.

A former RMIte, Chris Lotspeich is a principal with Second Hill Group, an independent consultancy in Coventry, Connecticut. He can be reached at chrislot@secondhill.com.

FOR MORE INFORMATION:

- For information on STMicroelectronics, including social and environmental report www.st.com
- Rumsey Engineers www.rumseyengineers.com
- E SOURCE www.esource.com

Envisioning a Sustainable Vancouver

By Michael J. Kinsley

For nearly twenty years, RMI has worked with communities interested in moving toward sustainability. Leaders in these places inevitably ask which communities have reached this fabled destination. We generally respond by describing the many wonderful things various communities — Burlington, Portland, Ithaca, Seattle, Chattanooga — are doing. But despite these cities' efforts, no community has yet attempted an across-the-board approach to sustainability.

This summer on a visit to British Columbia, Amory and I were given an extraordinary book and CD-ROM, *A Sustainable Urban System: The Long-Term Plan for Greater Vancouver*. We can now say that one city, at least, has developed a long-term plan clearly headed in the right direction, and built broad support for getting there. For that Vancouver won first prize in a global sustainable-cities design competition.



The book begins by examining forces that will shape any city this century, including technology, globalization, demographics, resource scarcity, and climate — with essays that offer food for any community's thoughts. They include phenomena that, in many cities, are ignored to the peril of future residents. For example, many urban leaders worldwide and especially in the United States simply ignore global climate change. I hope these leaders are right; but if they're wrong, residents will suffer mightily. History is rife with human suffering caused by leaders' denial of awkward realities. In sharp contrast, this plan demonstrates that Vancouver leaders have begun considering the implications of, and ways to respond to, climate change — including ways to adapt to it.

The CD-ROM's paper on climate states, "A prudent approach is to emphasize flexible and robust planning strategies that confer sustainability and survivability under all such scenarios," and goes on to list such potential implications as trade disruptions, fish mortality, water shortages, industry costs, and crop losses.

The slim but content-rich volume is not a plan in the conventional sense. It doesn't prescribe specific steps towards sustainability. Rather, it creates "an opportunity for finding solutions..." by, among other things, defining "our region as one system, where the people, the place, the infrastructure, and the governance systems are in constant interaction." With core themes of sustainability, resilience, and livability, the plan's remarkable vision says: "We will create an economy that prospers, not by exhausting the natural wealth and beauty of this or any other place, but by harnessing human potential and natural resources and energy that can be continually renewed."

The plan regards local assets and past successes as "seeds of sustainability," of which Vancouver has many.

RMI *in the news*

Visionary Gaviotas Founder Visits RMI



Paolo Lugari, founder of the extraordinary sustainable village Gaviotas in northeastern Colombia (and pictured here with RMI's CEO **Amory Lovins** and Executive Director **Marty Pickett**), recently visited RMI for the first time. After making a presentation to staff, he toured the headquarters building, then delved into a wide-ranging discussion of everything from biodiesel manufacture to climate, solar collector design to peacemaking. For more information see www.friendsofgaviotas.org, where Alan Weisman's inspiring

1998 book *Gaviotas: A Village to Save the World* is available.

Aphorism of the day: Paolo's father took him out of school "so as not to interrupt his education."

Examples include local renewable energy sources (*e.g.*, local companies that are world leaders in fuel cells) and BC Hydro's energy-efficiency initiatives (see story p. 12).

I was starting to think that the plan read like something Amory might have written. But no, it was much better — Vancouver locals wrote it.

Using powerful GIS-based Quest software, developed by Vancouver's **Envision Sustainability Tools** (www.envisiontools.com), the plan includes compelling charts and graphs that portray the effects of "business as usual" along with its result: "In less than half the time envisioned in our 100-year plan, if Greater Vancouver continues with business-as-usual, we will not be a sustainable, resilient, or livable region." Can you imagine leaders in your community having the courage to say that — and back it up with nonthreatening but persuasive facts?

Finding the city's current direction to be unsustainable, the plan then translates goals into forty-nine targets, including "clearly defined and quantifiable metrics, stipulating a specific level of performance that is required to achieve each goal" (*e.g.*, percentage of volunteerism, of exports certified as sustainable, of households spending less than 30 percent of their income on housing, etc.).

The plan offers ideas and new ways of thinking about planning that can be used in any city. For example, a paper on the CD-ROM called "One-System Approach" is a stimulating little treatise on integrating urban energy, water, and waste systems, though the language is awkward in places and some theory is a bit vague. It discusses, for instance, more efficient "cascading" uses of water and energy: instead of

using high-quality water and energy for everything, the article urges substituting lower-quality water and energy where they are appropriate. For example, sink water can be readily used on the garden and in the toilet, and partially-treated wastewater can be easily introduced into local wetlands.

The plan uses targets and backcasting to develop water strategies that will help the city reach sustainability in one hundred years. It begins: "Greater Vancouver has one of the highest per capita water uses in Canada. While [water] has been abundant in past years, climate change and increasing populations may lead to shortfalls in a few decades." Thus the plan's water target, though not rocket science, is to the point: "...live within the capacity of the current mountain reservoirs."

The strategy for achieving this target in residences (as an example) includes such measures as metering, xeriscaping, efficient toilets and appliances, and returning rainfall immediately to the ground instead of sending it to sewer systems. The plan claims that these solutions meet its self-imposed standards of "prudence, plausibility, and pro-activity." Applying analogous strategies to the commercial and industrial sectors, the plan anticipates that existing mountain reservoirs can suffice to serve the region into the next century, despite an anticipated doubling of local population and a projected decline in rainfall due to climate change.

Moving to implementation, the plan identifies eight "catalyst" strategies. Though they are too lengthy to discuss here, one in particular caught

Any city that includes such thorny issues as climate change in its long-range plan is far ahead of the pack.

Amory's attention: "Create shock resilient cells. Use a cellular structure to re-organize land use and critical infrastructure capacity, enhancing local ability to adapt rapidly to unexpected shocks." The plan says that the city can expect "an increasing variety and frequency of shocks, from the anticipated natural ones such as floods and earthquakes, to unanticipated plagues, droughts, computer viruses, organized crime, economic boycotts, toxic pollution, social unrest, and the loss of key trading partners." It says that existing infrastructure ignores these threats and that a "cellular structure" would reduce vulnerability. The structure would include a few very large self-reliant cells. "The structure then sub-divides into a collection of smaller, less autonomous cells. This [fractal] structure will be used to mitigate threats in a variety of ways."

Despite a few glitches here and there, this remarkable and visionary integration of strategic urban design is recommended reading for planners and active citizens who seek a more creative, innovative, and sustainable future for their own communities. Vancouver's vision for the future is as clear as the lakes in the nearby mountains. Any city that includes such thorny issues as climate change in its long-range plan is far ahead of the pack.

Cofounder of RMI's Economic Renewal program, Michael Kinsley is RMI's expert on sustainable community initiatives and its lead workshop facilitator. Copies of A Sustainable Urban System: The Long-Term Plan for Greater Vancouver can be ordered from www.sheltair.com — hard copies with CD-ROM for C\$75.00, or downloads free.

Exploring Vancouver Island's Energy Future

Rocky Mountain Institute works with a variety of organizations. One of our long-standing core specialties is helping utilities develop long-term energy resource investment strategies emphasizing sensible, cost-minimizing mixtures of efficiency and renewables.

Among our most recent clients in this area is **BC Hydro**.

One of the largest electric utilities in Canada, BC Hydro serves more than 1.6 million customers (over 94 percent of British Columbia's population) and generates between 43,000 and 54,000 gigawatt-hours of electricity annually from thirty-one hydroelectric facilities, three thermal plants, and a number of small diesel stations that provide local power to remote areas of BC.



RMI *in the news*

Hypercar Wins 2003 World Technology Award



HYPERCAR INC.

In late June, the **World Technology Network (WTN)** selected Hypercar, Inc. as the winner of the 2003 World Technology Award for "Environment." The Awards were presented by the WTN in association with Nasdaq, Accenture, Microsoft, Genencor International, Dupont Textiles and Interiors, *Time* magazine, *Technology Review* magazine, *Science* magazine, and *Business 2.0* magazine. The World Technology Awards honor individuals and corporations from twenty technology-related sectors selected by their peers as being the innovators doing work of the greatest likely long-term significance. Award categories range from biotechnology, space and energy to ethics, design, and entertainment.

Selection as a winner also means that Hypercar has been elected as a corporate member of the World Technology Network.

"It's quite an honor to receive this award," said **Dr. Jon Fox-Rubin**, President and CEO of Hypercar. "The diversity of the World Technology Network supports our view that many sectors of the community have an understanding of the need for, and impact of, vehicles based on hypercar[®] architecture. Within a generation or two, we sincerely hope there will no longer be a market segment called *environmental* automobiles: they will *all* be safe for our environment and our children. It's gratifying to know that our contributions to putting the car on the road to a sustainable tomorrow have not gone unnoticed."

Nominees for the 2003 World Technology Awards were identified through an intensive global process in which current WTN members (primarily winners and finalists of previous awards) made their nominations and then voted their preferences based on who they think are most innovative and impactful within their particular field.

James P. Clark, founder and chairman of the World Technology Network, added: "The World Technology Awards program was created to recognize truly extraordinary innovation on a global scale, the sort of work that could be described as creating our collective future and changing our world. Hypercar's contribution in the field of environment has been outstanding, and their selection as a new WTN corporate member is public acknowledgement of that fact."

The World Technology Network is a London-based organization created to "encourage serendipity" — happy accidents — amongst innovative individuals and companies. WTN's areas of interest range from IT and communications to biotechnology, energy, materials, and space, as well as related fields such as finance, marketing, policy, law, design, and ethics.

For more information, please visit www.wtn.net.

In 1999, RMI's CEO Amory Lovins was also a personal recipient of the World Technology Award (Environment) and a finalist in the energy category.

The rest of BC Hydro's supply is bought from BC-based independent power producers and from markets in Alberta and the United States. BC Hydro supplements its large central generation assets with small-to medium-scale distributed energy and energy efficiency programs, such as Power Smart, Resource Smart, Green Energy, and customer self-generation programs. In collaboration with transportation industry partners, BC Hydro also has an active hydrogen program (the Compressed Hydrogen Infrastructure Program, or CH2IP), which has built the world's first 10,000-psi gaseous hydrogen vehicle-fueling station at BC Hydro's Powertech Labs facility in Surrey.



On 14 July, BC Hydro and RMI convened a "meeting of the minds" to explore ideas to address the long-term energy needs of Vancouver Island. Participants of the workshop engaged in a "blue sky" visioning of Vancouver Island's electricity future, exploring small-scale and distributed energy solutions that may be viable in the long term (*i.e.*, 10–20-year time frame). At the time, BC Hydro was proposing to address short-term power concerns on Vancouver Island by building a new combined cycle gas turbine facility in Nanaimo, BC (on the island), which would be fuelled by natural gas from the proposed Georgia Strait Crossing Pipeline project. Both of these projects were before regulatory bodies for approval.

Representatives from RMI at the event included Amory Lovins, Kyle Datta, Joel Swisher, PE, Ph.D.,

"It was good to have people external to Hydro involved, to challenge our thinking and our decision-making framework. Now, we need to move forward using the results and incorporating the findings of the workshop into our long-term energy planning."

Richard Marchant
BC Hydro's Power Smart program

Katherine "Kitty" Wang, PE, and Michael Kinsley. BC Hydro staff, along with other efficiency and energy experts from around the province, also attended. The workshop's four subgroups discussed a range of topics, from demand-side management (DSM) and renewable energy to transmission and distribution, from energy storage technologies to BC Hydro's current costs, rates, and customer policies. RMI was most keen to help the participants emphasize integrated resource planning concepts across the boundaries of departments and disciplines. The diverse group enjoyed this creative approach to addressing Vancouver Island's specific long-term needs.

"RMI's approach is a refinement of the methodology used for traditional **integrated resource planning (IRP)**, in which demand-side management technologies such as energy efficiency improvements are considered as utility investments that can complement and compete with conventional supply technologies in energy resource planning," Kitty explained. "RMI takes a more locally-oriented, bottom-up approach, which is appropriate for addressing the situation on Vancouver Island."

"This was truly a ground breaking session, bringing together this group of energy experts in one room for one day to explore this challenge," said Bev van Ruyven, BC Hydro's senior vice-president of distribution. "Overall, I think the day generated over fifty ideas, and the group voted on twelve to follow up on immediately.

This is an exciting time and shows the potential for long-term energy planning at BC Hydro."

Much of the forward-thinking information about electricity services presented at the workshop came from RMI's award-winning 2002 book *Small Is Profitable* (www.smallisprofitable.org). *SIP* explains and details how small, decentralized electricity devices spread across the grid can supply, store, and distribute electricity more cheaply than most centralized systems, and reduce the risk of blackouts.

"It's a strength for BC Hydro that we have identified and are pursuing supply and demand-side options on an equal footing," said Richard Marchant, manager of BC Hydro's Power Smart program. "This planning across the lines of business and within their functions is important and produces valuable results. The RMI workshop was very valuable to me as a manager, and it was good to have people external to Hydro involved, to challenge our thinking and our decision-making framework. Now, we need to move forward using the results and incorporating the findings of the workshop into our long-term energy planning."

The workshop report's extensive smorgasbord of ideas for Vancouver Island gained new importance when the B.C. Utility Commission, on 8 September, rejected the gas-fired plant because it hadn't been shown to be least-cost. BC Hydro promptly began contracting for wind power, small hydro, and a diverse portfolio of other green alternatives.

Greening the Grocer

Stand in front of the typical grocery store freezer with the door closed (while you wrestle with the knotty problem of Ben & Jerry's yogurt vs. real ice cream) and you get a good first lesson in the energy efficiency challenges faced by supermarkets. Cold air spills from the device and settles on the floor around your sandaled feet. You shiver and make a hasty decision — one you might regret later.

Rocky Mountain Institute's Green Development Services (GDS) is working on small challenges like freezer efficiency as well as much

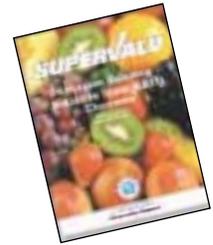
bigger resource issues that encompass the entire supermarket retail industry's buildings.

John Domino, of the **Supervalu** supermarket chain, had read about Amory Lovins's and RMI's work in a 2000 *Time* magazine article. Curious to see what he could achieve in the chain's prototype store, Domino hired GDS to conduct a charrette early this year. Supervalu is the eleventh largest supermarket retailer in the United States with over 1,400 stores (including Cub foods and Farm Fresh) in thirty-nine states. Brainstorming sessions revealed a mix of technological solutions, ranging from conventional to experimental, for the stores' lighting,

refrigeration, HVAC systems, and building envelope.

Supervalu staffers and GDS's team working on the facility calculated that just the lighting efficiency ideas could save 28 percent of the energy used by the 70,000-square-foot prototype store.

The team also investigated a thermal displacement ventilation system (being successfully used in Sainsbury grocery stores in the United Kingdom), which uses natural convection for airflow. The final mechanical and refrigeration package savings is estimated to be 35 percent.



RMI *in the news*

Rasmussen Joins RMI as Senior Fellow

Commander Eric Rasmussen (US Navy), MD, MDM, FACP, former Fleet Surgeon with the U.S. Navy's Third Fleet, has joined RMI as a senior fellow. A Stanford-trained physician, a fellow of the American College of Physicians, and with a master's degree in disaster medicine from the World Health Organization, Eric currently works on medical issues for international humanitarian operations. Most recently he was physician-coordinator for the Iraq Humanitarian Operations Center in Kuwait during the war in Iraq, and remains an advisor to senior leaders within the Administration, both domestically and within Iraq. In addition to his academic positions in medicine, computer science, and epidemiology, he also serves as a Principal Investigator for the **Defense Advanced Research Projects Agency (DARPA)** and the **National Science Foundation**.



Beyond his humanitarian work in Kenya, Uganda, Zambia, Bosnia, and the Middle East, some of his DARPA efforts have been remarkable, notably his directing the June 2000 **Operation**

Strong Angel international exercise, a major civil-military refugee-assistance training event in humanitarian support. Strong Angel was conducted in a barren region of the big island of Hawai'i within a larger multinational exercise, RIMPAC 2000, that involved seven nations, 22,000 people, fifty ships, and 200 aircraft. Strong Angel's goal was to familiarize multinational militaries and the main United Nations relief agencies with each other's capabilities, strengths, and limitations, then create a replicable system for subsequent humanitarian efforts, and subsequently to develop a coordinated response to crises. The results were briefed to the Joint Chiefs of Staff, and the guidelines developed from Strong Angel later contributed to the management of civilian casualties within the war in Iraq.

Eric (above, in front of a monument celebrating Saddam Hussein's reign) co-led RMI's 2002 "**Sustainable Settlements**" **charrettes** in Aspen and Santa Barbara. Although a practicing academic physician in San Diego, Eric's current work also involves integrating humanitarian assistance and sustainable technology, and he has played a key role in the development of austere communications tools for helping displaced populations and the organizations that work with them. "There are few people who know the on-the-ground realities of international humanitarian and security issues as well as Eric," said RMI's CEO Amory Lovins. "We — and the world — are lucky to have him on board."

GDS has a history of working with large retailers. In 1999, GDS led a charrette for a prototype **Stop & Shop** grocery store. The resulting landmark building for



Ahold, the Netherlands-based owner, exceeds by roughly a third the initial goal of a 30 percent saving, and goes beyond energy to demonstrate many green building techniques applicable to grocery stores internationally.

Further, the company garners higher sales with the improved store. RMI CEO Amory Lovins believes that a comprehensive, clean-sheet redesign of a typical supermarket could save as much as 70–90 percent of normal energy usage, possibly at lower capital cost, while improving both merchandising and food safety.

In the 1990s, GDS helped make the first “eco-WalMart,” located in Lawrence, Kansas, more energy-efficient and environmentally sustainable. As documented in numerous GDS reports, the project’s productivity, as measured in sales per square foot, was significantly higher in the daylit half of the store. WalMart, too, is weaving green concepts into its stores. Clearly, these kinds of energy and resources savings are getting retailers to think “outside of the box.”

Letter of the Month:

Homemade Money

20 March 2003

Dear *RMI Solutions*,

Last night I had the great pleasure of spending some time with Amory (for the first time in a few years) at the California Academy of Sciences presentation in San Francisco, and he said that you might be interested in hearing our story.

We own a tract house in El Cerrito, Calif. of just under 1,200 square feet, built in 1947. The priority when it was built was speed of construction and, as a result, it started life as one of the least energy-efficient buildings you’d ever hope to not meet.

In 2000 and 2001, it became apparent that we would have the money to overhaul it comprehensively, and the first thing — literally — that I bought was a copy of *Homemade Money*, from which we picked and chose, following the path of “cheapest stuff first.” Unfortunately, it wasn’t cost-effective to install photovoltaics — our roof has little south-facing exposure, and what we do have is well shaded by a sturdy tree that doesn’t belong to us. But we went to town on the low-temperature hydronic heat, double-glazed windows, and a staggering quantity of fiberglass batt. Our contractors cheerfully went along with most of this, but were a little nonplussed at being asked to build garage doors that were four-inch-thick hollow boxes stuffed with insulation! (Between that and the skylight, the garage is now as livable as any other room in the house.)

My one regret is that we ended up using very few recycled materials, mostly for logistical reasons. We were, for example, looking forward to installing roof shingles made from discarded steel-belted tires, until we were told that freight charges would about double their cost and would blow our budget straight out of the park. We also couldn’t get — or, more exactly, gave up on getting — fly-ash concrete.

We’re more than satisfied with RMI’s contribution to our renovation.

Our cash savings are about \$80 a month, including a \$140 annual discount on our homeowner’s insurance. But the most worthwhile improvement is in quality of life; there are now no cold or drafty spots anywhere in the house, and the double-pane windows cut the noise from outside by at least 10 decibels. Thank you, RMI.

Yours,

Kip and Hilary Crosby
El Cerrito, California



Pick up your copy at:
www.rmi.org/store/pid385.php

Building Partnerships, Receiving Recognition



Marty Pickett,
Executive
Director

We at RMI are always cognizant of our goal to get out RMI's "work" and "word" as broadly as possible. Two significant and diverse developments in that arena are happening as I write: collaboration with other entities, and recognition for our accomplishments on a national scale.

RMI's credibility and track record over the years have positioned us to partner with other leading organizations to ensure that our work has the greatest possible effectiveness and impact. RMI's most recent collaborative relationship is with the **Urban Land Institute**, the top global organization of and for real-estate developers. Its new President, **Harry Frampton**, has chosen sustainability as a theme and directive for ULI during his tenure. This is a natural teaming effort for RMI's **Green Development Services** that has broken new ground for years on "green" architecture and land use planning. We are excited about the possibilities, recognizing that Harry Frampton has the respect and power to convene the leaders in this industry who can help both RMI and ULI realize our mutual vision for more sustainable real estate development.

RMI has also recently been notified that it is one of three finalists for the Environment Design Award of the National Design Awards program of the **Cooper-Hewitt National Design Museum, Smithsonian Institution**. Having been named one of three finalists (from twenty-five nominees) for this distinguished annual award is a wonderful achievement for RMI. The nomination was based upon RMI's work in green design, redesigning business and global security, and transforming the design of the energy sector, among other design projects and methodology.

Please be on the lookout for RMI on these two fronts, and the many others highlighted throughout this newsletter.

Editor's Notes

The Built Environment Needs Our Help



Cam Burns,
Editor

According to a well-circulated 2001 EPA study, *Our Built and Natural Environments* (www.epa.gov/smartgrowth/pdf/built.pdf), the urbanization of the United States is one of its most pressing issues.

As the document reports, "many urban areas have increased in size by fifty percent during the past thirty years, with the increase in land development far outstripping population increases." Today roads take up approximately 11.1 million acres of land (an area the size of Maryland and Delaware combined); buildings and parking lots take up between 1,910 and 3,035 square miles (estimates vary), and

there are 74 million acres of urban land in the forty-eight contiguous states.

These are some mind-boggling numbers, and the adverse impacts of the great Paving of America fall into every category of illness ever conceived, from physical and societal diseases to economic and political maladies. Worse, as a subhead in the March 2001 issue of *Scientific American* put it, "Suburbia was a dream inspired by revulsion to city life. Now many suburbs are just as crowded, and sprawl moves on."

Clearly, we can't just build it, trash it, and move on — to wherever *on* might be. We have to build our civilizations better so that the exoduses are fewer and smaller.

Luckily, we have the Urban Land Institute and the **U.S. Green Building Council**.

The USGBC's LEED™ rating system is becoming the national yardstick for the built environment, and ULI's prodigious publications mean that anyone wanting to do good design has access to reliable and reputable information.

Just as carbon emissions regulations are likely to become binding, I predict that one day things like LEED ratings will become the minimum requirement for those creating built environments. Legally-required design reviews by governmental boards will include energy and resource consumption models, and standards for our built environments will thankfully be raised a few notches — at least for now. RMI is pleased to be working with both ULI and USGBC, and wish them well for the coming year. Now more than ever, the built environment needs as much help as it can get.

Greg Kats, Capital E



Editor's note: In this and coming issues of RMI Solutions, we will profile former RMI staff members.

For Greg Kats, day-to-day work regularly involves advising governments and corporations in energy efficiency and renewable energy deployment and investments and green design. Greg has counseled some highly influential bodies, including the Parliamentary Committee on Environmental Sustainability of the British House of Lords and the Environment Committee of the Hungarian Parliament. But not surprisingly, his first major work on energy was done at RMI.

Greg Kats came to RMI in 1987, after finishing simultaneous graduate programs at Stanford and Princeton. His connection with RMI had roots in a chance encounter a few years earlier. He'd been inspired by meeting Amory Lovins and Hunter Lovins in 1982 at the University of North Carolina in Chapel Hill, where the two had been speakers.

As a visiting scholar at RMI, Greg coauthored with RMI researcher **Dr. Will Keepin** an influential 1988 *Energy Policy* article that compared the worth of nuclear energy with that of energy efficiency in combating climate change. At that time, as now, nuclear advocates argued that nuclear energy, because it produced electricity without carbon emissions, was the ideal solution to global warming. Greg and Will showed that investing in nuclear power actually *retards* cuts in CO₂ emissions by squandering capital that, if spent on cheaper options (such as energy efficiency), would have displaced more coal-burning per dollar. Their research showed that a dollar invested in energy efficiency displaces at least seven times as much

greenhouse gas emissions as a dollar invested in nuclear power. This obvious opportunity-cost argument — economese for “you can't spend the same dollar on two different things at the same time, so each investment foregoes other potential investments” — had previously been overlooked.

“That, to me, was just tremendously fun,” Greg said. “I found that RMI was just an exciting place to be, intellectually.”

Time off was exciting, too. Greg, an ex-wrestler, was never inactive. In their spare time, Will was teaching Greg to fly in a two-seater Piper airplane co-owned by Will and RMI staffers **Hal Harvey** and **Rick Heede**.

“We flew all over, including over the Colorado River, down between the canyon walls,” he said. “It was pretty spectacular.”

Working for RMI also stimulated Greg's interest in environmental activism. After RMI, he spent about four years as a marketing manager for Reuters Europe, based in Paris, then Geneva and then London, but continued to work on environmental boards. He soon had an opportunity to return to energy work full time.

During the Clinton Administration, Energy Secretary Hazel O'Leary asked Amory Lovins to “loan” her a couple of his best energy people. She borrowed Greg and **Dr. Joe Romm**, but never returned them. Greg was soon DOE's senior advisor to the head of policy planning and evaluation, becoming director of financing for the \$1.1-billion-a-year Office of Energy Efficiency and Renewable Energy. There he launched and led the development of innovative financing initiatives to support clean energy projects. Among these projects were a \$50-million off-balance-sheet financing that allowed often poor

“RMI is inspirational, both intellectually and in terms of its physical beauty which reminds us ... that man, absent the environment, doesn't exist, and that we bear a responsibility to maintain the environment for future generations.”

minority colleges to gain access to capital to do energy efficiency upgrades, and a \$400-million loan to Russia that was the largest energy efficiency loan ever. He also devised a national green power/insurance initiative that creates a synthetic insurance support for the green premium part of green power contracts — a very cost-effective risk-pooling and -management tool that the *Financial Times* described as “remarkably high leverage.” He further helped persuade the SEC to clear major obstacles to the global expansion of U.S. energy service companies.

Greg also initiated and led an inter-agency effort that secured a successful U.S. position against funding of nuclear power plants in Eastern Europe by the European Bank for Reconstruction and Development because these are not the lowest-cost option compared with untapped energy efficiency potential. In 1995, Greg, still with DOE, co-founded with Prof. Arthur Rosenfeld (former head of Lawrence Berkeley National Laboratory's buildings division and now a California Energy Commissioner) the **International Performance Measurement and Verification Protocol**. IPMVP is a globally recognized set of standards used to calculate and confirm the savings from energy- and water-saving investments, so they can be aggregated and securitized — rather like devising the standard application forms and secondary markets that now make home mortgages so cheap and easily accessible. Greg served as manager and chairman of the IPMVP

CONTINUED ON PAGE 31

Red Cain, RMI Maintenance Department



If you get up very early and visit the Windstar Land Conservancy, where RMI's Southeast Annex is located, you might witness a

collision of the Old West and the New. Here's the scene: whooping and hollering and waving his hat, a stocky white-haired cowboy astride a four-wheeler circles and charges a small herd of uncooperative cattle. Bouncing around as if he were riding a wild horse, the cowboy startles the slow-witted beasts enough to move them, and they shamble off to the next pasture. The ATV cowboy zips to the edge of the meadow and begins to reposition a moveable solar-powered electric fence. That done, he moves on, heading for another job on another part of the property. His cowboy hat disappears in a swirl of dust.

Meet Red Cain, RMI's resident ATV cowboy. One of the few early risers at RMI, Red is at the office at 6 a.m. every day, working with the cattle and irrigation in the summer and plowing snow and adjusting the solar heating systems in the winter. Red is a carpenter, mason, plumber, electrician, and handyman. He builds partitions and shelves, maintains the gravel drives and parking lots,

moves whatever needs to be moved, and fixes everything that's busted — and he also hands out friendly, down-to-earth advice to young staff members.

Despite all these roles, fishing is Red's biggest passion these days, and though he'll probably take it up full-time in about three years, he's not quite ready yet to give up riding around like a youngster on that ATV.

Red spent his early years in Kansas. Just out of high school, he took a job putting up steel grain-storage buildings, and then worked in the horse-racing business for five years as an exercise boy and groom.

Red joined the Seabees, the Navy's construction outfit, and completed training schools in all the building trades. He did three tours of duty in Viet Nam and another in Alaska. His outfit was sent to Kodiak Island for seven months to rebuild after the earthquake of 1964, and worked not only on military installations but also on civilian houses and businesses.

Red has lived in the Roaring Fork Valley near RMI since 1968, a year after he married his sweetheart Sharon. The Cains bought a five-acre patch in the Crystal Springs area near Carbondale in 1970, built a house there in 1972, and raised three sons.

The greatest change Red has seen in the valley are the hordes of people moving

in. But the weather has changed, too, he said.

"It was nothing to shovel 55 inches of snow off my roof in January, and then more in spring," he said. "We don't see heavy snows any more."

Continuing his career in the construction industry, Red built concrete forms for fifteen years.

He worked on the Fryingpan-Arkansas Project for several years, building the massive concrete water diversion structures that take Western Slope water to Front Range cities. He plied other trades as well, building a career with his hands before starting to work at RMI in 1995.

While most RMItes are well-practiced in the art of protecting the natural world through efficiency and the smart use of resources, most of us like to get out and enjoy it as much as we can, too. Red is no different. He has been a devoted outdoorsman since his childhood in Kansas.

"We went fishing and hunting all the time when I was a kid," he said. Now he fishes every chance he gets — his vacations are devoted to angling, as are most of his weekends. "I go fishing somewhere every other weekend all summer long," he said. And meanwhile, he keeps RMI working well.

—Jeremy Heiman

RMI *in the news*

U.S. State Dept. Touting *Capitalismo Natural*



As readers know, President Clinton was a big fan of RMI's 1999 book *Natural Capitalism*, and it appears the current Administration likes the book too. The U.S. State Department is still hosting an excellent Spanish translation of Chapter One of *Capitalismo Natural* on its website, at <http://usinfo.state.gov/espanol/sustain/capitalsp.htm>. This is all the more gratifying because, remarkably, the book's dozen languages don't yet include Spanish or French. When renowned sustainability leader **Paolo Lugari** was visiting RMI (see p. 10) he pointed out the website to RMI CEO Amory Lovins. "We obviously have some friends there," Lovins noted. "Now all we need is the other fourteen chapters *en español*."

"Architect Renzo Piano came by himself, with only a sketchpad and a green felt-tip pen."

California's New Academy of Sciences

By Dr. Patrick Kociolek

Golden Gate Park is undergoing a dramatic transformation as various scientific and arts facilities are reconfigured, rebuilt, and reopened. The rebuilding of the California Academy of Sciences represents a major part of this revitalization. How we realize a new facility is critical to not only our staff and scientists — the new Academy must be a leader in the presentation of science and the communication of scientific concepts to millions of people. We also hope our new facility will become a masterful and innovative expression of contemporary architecture.

Plans for the new Academy began as a response to damage caused by the 1989 Loma Prieta earthquake. But as we talked to people about our facility, programs, and exhibits, we realized we faced a much bigger challenge than patching leaky roofs and making our facility seismically safe. Science and environmental research are going through a revolution. People feel they are losing ground in understanding science and scientific advances. As the Academy marks our 150th anniversary, I can't imagine a more critical time for our institution to help address the challenges of a changing world.

As we began our planning process, we talked with officials at more than a dozen natural history museums undergoing renovation or expansion projects. Fueled by the rapid growth of biodiversity and conservation issues and a burgeoning of science-based industries, awareness is growing about the crucial role science muse-

ums play in education and environmental conservation. We learned that to excite visitors about science requires a different approach than the static, Victorian-era model used by most of the world's natural history museums.

The Academy's board of trustees and I spent many months gathering ideas and opinions of Academy staff, Bay Area residents, scientists, educators, and environmentalists to understand how to communicate scientific issues.

Because it has a natural history museum, an aquarium, and a planetarium, the Academy is unique. The combination allows us to tell the story of how the universe, the earth, and the oceans all function in an integrated system. Yet, despite the monolithic front, the Academy is actually an amalgam of twelve separate buildings, and

integrating the Academy into a unified complex became one of our challenges. Further adding to the complexity of the project are the Academy's holdings of more than eighteen million natural history specimens — plants, animals, minerals, and archaeological artifacts that all tell of the history and evolution of the world.

As we developed these aspirations and the vision of what the new Academy could be, we began to look for an architect who could design a building that would enable us to achieve these goals. Most of the architects we interviewed arrived with minions and models and fully developed ideas of what they thought our building, and the Academy, should be.

But one architect, **Renzo Piano**, stood out. Piano came by himself, with only a sketchpad and a green felt-tip pen. Instead of explaining his design for the new Academy, Piano simply asked what the Academy's ethic was. His portfolio was not characterized by a single signature style — each project possessed sensitivity to the needs of his clients and pushed the boundaries of esthetics, engineering, and technology to meet those needs. We immediately knew Piano was our architect. We were also committed to having a local architect form part of the team, and chose **Gordon H. Chong**, a creative, innovative local designer with a deep understanding of San Francisco.

Lifting Up a Piece of the Park

From the first time he visited the Academy, Piano could often be found outside, sitting on the concourse or in front of the former de Young Museum or atop the Academy's patch-mottled roof, observing and sketching. We wanted the new Academy to become a harmonious part of the park, and not rise above the current height of African Hall (approximately 40 feet). Piano designed a curving roofline echoing the contours of the landscape. The initial concept evolved into a "green roof," which offers a balance of ecological, aesthetic, and energy efficiency benefits. Covered with more than two and a half acres of native plant species, it will, in Piano's words, be like "lifting up a piece of the park and putting a building under it." A visit to the new Academy will no longer mean feeling isolated from the outdoors. Glass curtain walls and glass expanses on the roof will allow natural light into the interior. This abundance of natural light, a characteristic of most of Piano's buildings, will offer an alternative to electric lighting and will enhance the visitor experience. Sensitivity to the Academy's history is equally important, and the design calls for integrating the elements of several buildings that embody the Academy's rich history.

The design also reflects a close collaboration between the architects and exhibition designers. This lively collaboration prompted both groups to come up with more imaginative ideas than either would have developed working in isolation. Interesting to

me as a scientist, this collaborative design effort mirrored the best type of collaborative research, with each group offering its specific expertise to achieve a greater overall concept. With form and function being considered in unison, the undulations in the roof were altered slightly so that they will slope over two major exhibitions: a new Morrison Planetarium and an enormous fish tank. Plans for the fish tank evolved into a 225,000-gallon exhibit of a Philippine coral reef that will stretch between a lower level and the ground floor. A multi-level, glass-enclosed, living rainforest will be located opposite the new planetarium.

New structures will house scientists, collections, staff, and classrooms. The courtyard, currently exposed to the elements, will be redesigned for year-round use. Areas for various activities will be arranged around the "piazza," an ideal area for visitors to gather. The buildings will be connected by glass façades, and the rolling roof will cover the entire complex, unifying the various parts of the facility.

A Green Academy

From Madagascar to the San Francisco Bay, Academy scientists discover, collect, and study animals and plants to establish baseline data that inform our understanding of the species that co-exist with us, their place in evolution, and conservation management. This work has become increasingly important as the earth's diverse life-forms and environments are altered or obliterated by human activity.

"Through very thoughtful design and careful integration of systems, the new Academy will achieve a high level of performance without costing any more to build than a standard building."

The new Academy is one of ten pilot "green building" projects of the **San Francisco Department of the Environment**, part of a vanguard initiative to develop models for workable, sustainable public architecture. The new Academy will be a high-performance building that makes optimal use of resources, minimizes environmental impacts, and serves as an educational tool by demonstrating how humans can live and work in environmentally responsible ways. To help us achieve our ambitious goals, we have retained **Rocky Mountain Institute**, whose Green Development Services team has consulted on more than 300 projects worldwide, including the "greening" of the White House, Lucasfilm's Presidio studios, and the Sydney 2000 Olympic Village. While there are varying shades of green as measured by the U.S. Green Building Council through its LEED™ (Leadership in Energy and Environmental Design) rating system, the Academy will strive to achieve the highest: **LEED platinum**. The sustainability features planned for the new Academy can easily be understood when compared to a standard building. For instance, whereas standard buildings do not capture or treat stormwater, the green roof of the Academy will reduce runoff by at least 50 percent (possibly as much as two





The CAS “green roof” in context (above, below left).

Photo and drawing: courtesy Renzo Piano Building Workshop

million gallons of water per year) — water that would otherwise carry salt, sand, soil, pesticides, fertilizers, oil, litter, and other pollutants into nearby waterways. The green roof of native California plant species will provide excellent insulation and increase biodiversity by offering habitat for honeybees, hummingbirds, and butterflies.

Though cutting-edge technology will be apparent in the new Academy, we will also employ the age-old engineering techniques of daylight and natural ventilation. Large-but-controllable areas of glass in the façades and the roof will let daylight into offices, research, and exhibition areas, reducing energy use and heat gain from electric lighting. These areas will also have windows that can be opened — which is unusual today — decreasing the use of mechanical systems.

The Academy will use approximately 50 percent less energy than California codes allow a standard building to consume. Some of this energy will come from clean, renewable sources, meaning a significant reduction in pollution.

Besides saving energy, daylighting and natural ventilation systems will make

the interior of the building more comfortable. The design team is also carefully selecting healthy, non-toxic building materials that do not cause indoor air pollution. An improved indoor environment will not only benefit staff and visitors; the Academy can also expect higher levels of productivity and lower levels of staff absenteeism.

Through very thoughtful design and careful integration of systems, the new Academy will achieve a high level of performance without costing any more to build than a standard building. More importantly, over the next hundred years the new building will pay enormous dividends by reducing operating and

maintenance costs by as much as 60 percent below those for a standard building. This “return on investment” will further support the Academy’s work.

Understanding science is absolutely essential for participating in our democracy, for without that knowledge, individuals become alienated not only from the discussion of issues that affect them, but from the community itself. Understanding science enables people to make informed decisions on such issues as energy consumption, the conservation of natural resources, environmental concerns, their health care, and other complex problems. The Academy has a profound responsibility to provide the information to frame and lead these deliberations and to help find sensitive, workable solutions.

And as a California-based institution, our responsibility is a special one.

The Bay Area has been a leader of American culture since before the City of San Francisco was founded. We have led the nation in the appreciation of diverse lifestyles, rock and roll, fusion cuisine, viticulture, and in the sartorial takeover of blue jeans. And this region has been a leader in science-based industries from computer software to communications technology to biotechnology. But most of all, we are leaders in environmental issues and conservation. Long before the rest of America, we understood that was critical to protect the natural world. In few other parts of the country is there such a heartfelt sense of the beauty of the natural world and the need to safeguard it. That’s really what the Academy project is about: inspiring future generations to discover, celebrate, and protect the astonishing splendor of the living world.

About the Author



Dr. Patrick Kociolek is the Executive Director of the California Academy of Sciences and William R. and Gretchen B.

Kimball Chair. He is also a research scientist and holds the Hanna Chair in diatom studies.

Brian Rosborough

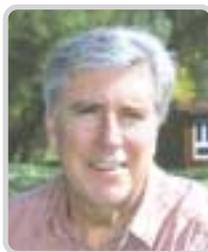
Brian Rosborough's first career, investment banking, provided him with excellent background for his second career: raising capital for scientific and environmental research and social entrepreneurship.

"I made a 'lateral arabesque' from investment banking into social venture capital," Rosborough said. A founder and former chairman and CEO of **Earthwatch Institute**, Rosborough has been associated with the organization for twenty-five years. (He is also former editor of *Earthwatch* magazine.) Earthwatch is a nonprofit that locates funds to support scientific research worldwide. Earthwatch-funded projects have provided improvements in public health, overseen the discovery of new species, and mandated protection for coastlines and threatened marine mammals. Rosborough remains a member of Earthwatch's board of trustees.



Brian (with balloon and curious kids) in China.

Rosborough is also a member of RMI's board of directors, and said that his work with Earthwatch led to his connection with RMI. He met Amory and Hunter Lovins about fifteen years ago and saw them regularly at conferences, often when all three were featured speakers. RMI's work had numerous similarities to Earthwatch's work, which is also directed at the efficient use of resources and the conservation of dwindling ones.



"That was the nexus with RMI," Rosborough said. "We were both interested in use and abuse of the resource base." Earthwatch is built on the premise that scientists and scholars, like entrepreneurs, need seed capital and manpower to achieve their objectives. Earthwatch furnishes both, and the organization has funded 2,500 scientific expeditions in 120 countries to date.

Rosborough co-chairs the RMI board of directors' **Development Committee**. From that seat, he's in a position to influence the progress of some of his favorite RMI projects. Some activities he particularly admires include RMI's biomimicry research, education efforts, energy research — notably the work that led to the publication of *Small Is Profitable* — and pretty much anything in the way of green development. "A better and more efficient built environment is needed for our successors," he said.

Also, RMI's organizational form appeals to him. "RMI is exciting," he said. "The Institute is an innovator." Counseling that resource efficiency increases profits offers the best of all worlds to clients. "Return on the client's investment is important," he said. He believes deeply in RMI's work, which he describes as "a yeasty blend of evangelism, civic enterprise, and pragmatic advice to industry and government."

Brian's goals for the Institute include assisting in the strategic planning process, so that the Institute continues to thrive. "All organizations, during periods of rapid growth, need to redefine their mission constantly," he said, noting that support from an advisory board is as important as leadership and policy advice.

"It's refreshing, working with people who don't believe it can't be done."

As a board member, he feels it's necessary "to listen thoughtfully to plans and strategies, to ask the right questions, and to support the work of the professionals on the staff."

Rosborough's vision for RMI includes continuing to offer solutions that deliver originality to clients and sponsors while meeting the highest standards of effectiveness and reliability.

Rosborough has a bachelor's degree in history from Princeton and a law degree from the University of Florida. His resume includes a stint as a naval officer and some time as a merchant seaman. His service on boards is not limited to RMI and Earthwatch — he is a trustee of Deerfield Academy and the Boston Fulbright Committee, and a past trustee of Princeton University and Mt. Holyoke College.

Rosborough's current work is an extension of his work at Earthwatch — he's creating programs for innovators in developing countries, working in the areas of information technology, health, education, and environmental services with the **United Nations**.

He spends considerable time keeping up with "the young ones," he said, and his rare spare moment is spent reading or "looking for my next noble pursuit." In the meantime, though, he and his wife Lucy, from their home in Concord, Massachusetts, are on board with us in the Rockies.

"I love RMI," he said. "It's refreshing, working with people who don't believe it can't be done." For, as Henry Ford put it, "Whether you think you can or whether you think you can't, you'll be exactly right."

—Jeremy Heiman

Bud Konheim: Growing a Chrysalis

Eric Konheim might have been one of RMI's greatest supporters. He was a believer in the Institute's mission, and took RMI's message of resource efficiency and shared it — in his own style, often-times in the form of recycling efforts — with the world. Eric was so devoted to RMI that today, twelve years after his death in a kayaking accident, the **Konheim Internship** is one of the most sought-after by college-aged applicants hoping to work at the Institute. Not surprisingly, one of the people Eric influenced most was his father, Bud Konheim, who has not only carried on Eric's tradition of support with RMI, but has also spread RMI's work throughout his networks in the fashion industry and in the greater New York city area.

"When Eric died I had a choice of wallowing in the emotional distress and my sense of personal devastation or trying to use the intensity of my feeling to 'keep Eric alive' by furthering his support of RMI," Bud said recently. "After twelve years, RMI's success in its field has rewarded my efforts and has made me think even more of Eric who identified it in its early years. The high level of Konheim Interns, and their yearly contribution to the 'art of a healthy environment,' makes me proud to have Eric's name attached to it."

Bud Konheim grew up in Woodsburgh, NY (pop. 805), one of a larger group of communities loosely called "the five towns" on the south shore of Long Island. "I went through public school until the ninth grade when I went away to Phillips Exeter Academy in Exeter, New Hampshire," he said. "For four years at Exeter I was always in some kind of behavioral trouble. I was growing up from fourteen to eighteen and acting out for the merriment of my classmates and the distress of the faculty.

Somehow I managed to get a first-class education and, as important, a real sense of right and wrong. This, coupled with my parents' training in 'fairness,' was the foundation for the rest of my life." In 1953, Bud entered Dartmouth College, in New Hampshire, though he admits he "had not quite grown up" and study took a back seat to "leisure activities." One act of misconduct led to a one-semester suspension — "needless to say it cured my behavior and I returned to graduate in 1957."



The late 1950s was a time when many young men were going into military service. The Korean War had recently ended, and like many others of his generation, Bud decided to join the U.S. Marine Corps in 1958. Boot camp at Parris Island, SC was, next to Exeter "the best education and training I've ever had."

Bud was promoted meritoriously to PFC in one month and won the platoon's "Blues Award" (a set of dress blues). He was also voted "outstanding man" in his platoon, and shot high on the range — accomplishments for which he is as proud as "anything else I have done in the forty-five years since."

Bud remained in the Marines for six years, then went to work in his father's apparel manufacturing business. A career of making boxes out of corrugated cardboard was supplanted by a career as a

traveling salesman. Bud was married in 1962, thankfully putting an end to the constant traveling. Eric was born in 1963 and Alex in 1965. "They were the love of my life and I invested practically all my leisure time passing on the father-son pieces of experience and knowledge one cannot get from school: boats, camping, appreciation for nature," he said.

In 1955 Bud's mother had started an apparel business that was an instant success, and in 1970 she bought Bud's father's business. Bud, his father, and his brother all started working for her.

One thing led to another and the business grew, but one day Bud's mother got sick and could not continue. Bud went out on his own and the result was **Nicole Miller**, an apparel firm that thrives on product differentiation by design. According to Bud, while most of the apparel industry is self-destructive because it emphasizes price, Nicole Miller has been successful because the firm sees the opportunity and value in great design and product.

"In that way its business philosophy is similar to RMI's philosophy," he said. "Neither company accepts the prevailing customs as the truth, and both companies try to innovate solutions. This has made it easier for Nicole Miller to attract people to RMI, since it is more or less the same audience. As a yearly routine, everyone who is considered a 'friend' of Nicole Miller is solicited to become a friend of RMI."

We at RMI never got to know Eric, but from his parents, we can begin to guess what a remarkable young man he was, and be proud that he thought well of our work.

RMI Supporters form National Solutions Council

LOCAL DUO KICKS OFF MAJOR 'GET-THE-WORD-OUT' EFFORT

One of the odd things about RMI is how well the Institute is known globally, yet how little it's known in the Roaring Fork Valley of Colorado, the Institute's own backyard. Now a couple of enterprising Aspen area residents are helping to raise RMI's profile and to provide a way for individual donors to be more "hands on" through a new entity, RMI's **National Solutions Council** (NSC). Although the NSC was first introduced in the Roaring Fork Valley, it will be open to RMI supporters from all over the country.

Elaine LeBuhn and Kathy Finley, co-chairs of the NSC, have vast experience at gathering momentum behind a good cause, and recently joined forces to give RMI greater prominence among the business and community leaders who, at least part of the time, call this valley home. Kathy and Elaine believe the NSC provides an ideal venue for people like themselves who want to help be part of the solutions that RMI hatches and propogates.

Specifically, the mission of the Council is to "promote RMI's work by initiating relationships with individuals on a national level, represent the interests of RMI in members' geographic regions, broaden the base of financial support for RMI, and sponsor specific RMI projects."

Certainly the National Solutions Council is starting under solid leadership. Elaine, who lives part-time in New York and part-time in Snowmass Village, is familiar with RMI supporters and RMI, as she has served on RMI's board of directors since October 2002.

Elaine brings a strong background in nonprofit and public interest work to RMI, including serving on the Patron's Council of Carnegie Hall and on the board of directors of the Rainforest

Alliance. On the board of National Public Radio, Elaine chairs the gifts and contributions committee and serves as liaison and chair of its President's Council.



Kathy Finley and Elaine LeBuhn.

She was director of development for the Aspen Institute for ten years. She learned of RMI both through her work in Aspen and via her husband, Robert LeBuhn, Board Chair of the Geraldine R. Dodge Foundation which also funds RMI. Elaine is also very involved with the Aspen Music Festival and School and co-chairs its 2003 and 2004 annual benefit. She's on the executive committee of the Maestro Circle of the Music Festival — a group dedicated to providing funds for student scholarships.

Kathy, who lives part-time in Aspen and part-time in Chicago, is a more recent member of the RMI family. "I became interested in RMI after 9/11," she said. "I wanted to become part of a solution, rather than be a spectator to a continuous struggle for limited energy resources. I researched and 'discovered' RMI. I was shocked that such an impressive institution was right in our midst. So I, like Elaine, wanted to make an effort to educate Aspenites about the great and important work being done here."

Kathy is originally from LaPorte, Indiana. After earning a degree in Spanish from the University of Colorado, Kathy went

on to become a trader on the Chicago Board of Options Exchange and later joined Paine Webber, heading up the institutional options division for the Midwest.

A longtime Chicago resident, Kathy has chaired various charitable events, including the Rita Hayworth Gala (for the National Alzheimer's Association), the Literary Arts Ball (for the Friends of the Chicago Public Library), and others. For the past five years, she has been President of the Development Board for PAWS (Pets are Worth Saving).

"Everyone has their own area of exposure," Kathy added. "The National Solutions Council will provide a social avenue for spreading the word, but perhaps more importantly, we plan for the NSC to sponsor a specific project at RMI to add 'ownership' of a project as part of the benefits of membership."

"I believe in the mission of RMI and am honored to be part of the organization," Elaine said. "It is a thrill when I can put a staff member in contact with a friend or colleague who has a question, knowing it will be handled professionally and quickly. I hope the National Solutions Council extends that type of public service to the greater community."

This summer's receptions for prospective members were hosted by **Gerald Hosier**, a renowned patent attorney, and **Alex Kaufman** of Kaufman Holdings Corporation. Both events featured RMI CEO **Amory Lovins**. Approximately 120 people attended the events, a number of whom committed to joining the NSC.

RMI is always looking for innovative ways to share its message with the world. The remarkable talent that the National Solutions Council is mobilizing will accelerate the Institute's success.



Colorado Rocky Mountain School and Battle Mountain High School Support RMI

Dale Levy,
Development
Director

As RMI staff members often note, young people are our future. Students from two Colorado schools have shown they're concerned about everyone's future, and recently donated \$5,000 to RMI. The donations originated with the Colorado Springs-based **El Pomar Foundation** which, as part of its **EPYCS program (El Pomar Youth in Community Service)**, gave 121 high schools \$10,000 each, a total of \$1.2 million, for their students to distribute to nonprofit organizations of their choosing. RMI submitted proposals to Carbondale-based Colorado Rocky Mountain School (CRMS) and to Battle Mountain High School (BMHS), located in nearby Eagle County.

"Students wanted to be a part of funding these continuing projects."

Heather Ojala

"Once a school is selected to be in the program, the students fulfill several required activities" in a given year, explained Terry Lee, CRMS's Development Director. "They poll the student body to gather information on their top areas of interest and write a mission statement. The El Pomar Foundation sends out the mission statements from all the schools to Colorado's nonprofit organizations, which then have the opportunity to apply for funding."

RMI submitted a proposal for a conservation project on the **Windstar Land Conservancy**, and was awarded grants by CRMS students Greg Bartlowmiejczuk, Michael Colangelo, Tipper Hassig, Emma Juniper, and Lisa Weir, and BMHS students Tyler Custer, Mallory Denker, Casey Goodman, Nicole LeRoy, Heather Osborne, Trisha Salazar, Teresa Sanchez, Lee Sandoval, Roberto Sandoval, Jeff Savonen, and Kim White.

The project includes monitoring and maintenance on the 957-acre Windstar Land Conservancy, so RMI can continue its research and implementation of sustainable and holistic land management practices.

"They felt the project fit their mission statement, which focused on the environment with an emphasis on education and preservation," said Lee. "They also felt the Windstar project could affect many people."

According to Heather Ojala of BMHS, the Battle Mountain students also felt RMI's efforts related closely to the school's EPYCS mission statement, which focuses on preservation of the environment.

"The most important aspect of RMI's work would be the conservation of land for the future, for wildlife, and the protection of open space," Ojala said. "Students liked that you were also working to rehabilitate lands that have already been injured by human misuse. They wanted to be a part of funding these continuing projects."



Battle Mountain High School students involved in RMI's EPYCS grant include (l-r): Casey Goodman, Heather Osborne, Mallory Denker, and Trisha Salazar. Program advisor Heather Ojala is in the center.



Colorado Rocky Mountain School students (top row, l-r): Jennifer Gee (faculty), Christopher Hassig, Greg Bartlowmiejczuk, Josh Buchman, Michael Colangelo, Terry Lee (faculty); (bottom row, l-r) Emma Juniper, Jessica Meister

RMI Supporters

Our sincere appreciation is offered to these friends who have contributed to RMI between 1 May 2003 and 31 August 2003. 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.

BENEFACTORS

\$10,000+

ARIA Foundation
Carol & William Beale
The Educational Foundation of America
Andre T. Heinz, Heinz Endowments
William & Flora Hewlett Foundation
The Joyce Foundation
Adam Lewis & Christie Interlante, Helen and Joseph Lewis Fund
Sandler Family Supporting Foundation

PATRONS

\$1,000 – \$9,999

Sharman & David Altshuler
Anonymous (1)
Lina & Aharon Castro (2), Castro Model, Ltd., in memory of Eric Konheim
Sally R. Cole & Dean Ambrose
Howard P. Colhoun Family Foundation
E. Kyle Datta, New Energy Partners, Inc.
Earth Share
El Pomar Youth in Community Service & Battle Mountain High School
El Pomar Youth in Community Service & Colorado Rocky Mountain School
Fanwood Foundation
John B. Gilpin

Ted L. Goudvis, Pathfinder Fund
Michael Gould, Bloomingdale's, in memory of Eric Konheim
David Haas & Mary Ellen Arvold, Liz Haas Memorial Fund
Stephen P. Hanson, in memory of Eric Konheim
Jennifer Susan Hawks
Gerald Hosier
Charles Kaplan, The Mayer & Morris Kaplan Family Foundation
Bud & Colleen Konheim, Nicole Miller, in memory of Eric Konheim
Carolyn Konheim & Brian Ketcham, Konheim & Ketcham, in memory of Eric Konheim
Colleen Konheim, in memory of Eric Konheim
Thomas C. & Sarah K. Konrad
Carolyn & Clarence Lange
The Leighty Foundation
Alan Luedtke, DuPont Commercial Flooring's Sustainable Growth Award program
Microsoft Matching Gifts (2)
Hideo Miki, Sankyo Seiko Co., Ltd., in memory of Eric Konheim
Mary Sue & William F. Morrill
New Millenium Communications
NewCars.com (4)
LaVelle Olexa, Lord and Taylor, in memory of Eric Konheim
Betty & Anthony P. Pennock
Coyote Phoenix
Nancy & George J. Records
Mark Ryan, DuPont Commercial Flooring's Sustainable Growth Award program
Arent H. Schuyler, Jr.

SPONSORS

\$100 – \$999

Thomas D. Adcroft
John L. Allen
Daniel Alpert
Dr. & Mrs. John R. Anderson

Chester A. Andrews, Oberlin College
Clinton J. Andrews
Leslie & J.F. Baken
Judith Barnard & Michael Fain
Joanne & Richard H. Barsanti
Reid Bennett, Flexitoys
Ed Berg
Alan K. Betts & Karen James
Stephen W. Biegel, in memory of Eric Konheim
Leland S. Black
William & Sandra Bliss (4)
Dorothy & Richard C. Bradley
Patti & Jules D. Burgevin, J & P Consulting
Shelley Burke, Starry Pines
Judith A. Byrns & Joe L. Bergquist, Notable Plantings, Inc.
Louise Candelaria
Daniel J. & Terri A. Caplan, Caplan Family Fund
John Patrick Carroll (4)
Rita & Frank Castagna, in memory of Eric Konheim
Duke & Jan Castle, The Castle Groupe
Freddy & Rosita Choi, Fred Simon & Company, Ltd., in memory of Eric Konheim
Todd Ciaravino, in memory of Eric Konheim
Atlee F. Clapp
Anne K. Clare
Joan K. & Harold K. Clayborn
Carole & Peter Clum
Michael F. & Linda M. Coady
Virginia M. Collier
Peter J. Condakes
Sam Cox & Julia Puchkoff
Barbara & Stephen J. Crandall, in memory of Phil Semmer
Julie & John S. Daniel
William D. & Bonnie Bartlett Daniels, in memory of Eric Konheim
Lois-ellin Datta (4)
Mary Alice DeBolt
William A. Decker, Sr.
Libby Dietrich & David Boorkman

Eric Lin Doub, Ecofutures Building, Inc.
Mary K. Dougherty & Erik Neumann, in memory of Eric Konheim
Mary & James V. Downton
Jaren & Bruce Ducker, in memory of Eric Konheim
Niko Elmaleh
John Ewer & Kathleen E. Whitlock
Jay Faillace, in memory of Eric Konheim
Fensterstock & Partners, LLP, in memory of Eric Konheim
Honey S. Fishman, in memory of Eric Konheim
Cornelia & Jan Flora, in memory of May and Carroll Butler
Judy & Kenneth G. Foot
Ann M. & Neal J. Forsthoefer
Gloria & Robert F. Fox
Robert Fox, Cook & Fox Architects
Martha & Ralph E. Frede
Katherine & Paul W. Gerke, Gerke Family Charity Fund
Jenifer & P.M. Gibbons, in memory of Eric Konheim
Cheryl & Steve Goldenberg
Stone Gossard, in honor of the green revolution
Joshua Greenberg, The Citigroup Private Bank, in memory of Eric Konheim
Richard C. Griggs, in memory of Eric Konheim
Kathy & Robert H. Gurland, in memory of Eric Konheim
Janet Guthrie & Warren Levine
Henry Hacker, Lifestyle Marketing Group, LLC, in memory of Eric Konheim
Eldon Haines & Linda Rose
John W. Hancock, III, Hancock Family Trust
Joseph Harari, Basic Resources, Inc., in memory of Eric Konheim
Gary & Rae Ann Hassell, Baker Creek School House

Terry Hatch
 Gary Herwitz,
 Fashion Roundtable, Inc.,
 in memory of Eric Konheim
 Hewlett Packard Employee Giving
 Peggy Hill
 Caroline P. Hirsch,
 in memory of Eric Konheim
 George & June His
 Michael P. Hydro
 Nancy Jackson & Eberhard Ramm
 Linda Jeschke
 Diane & Kurt Johnston
 Maggie Jones
 Carol & Stephen Judelson,
 in memory of Eric Konheim
 Mark E. Juedeman
 Jane & Joseph Kasov,
 J.S.K. Design, Inc.,
 in memory of Eric Konheim
 Brandon F. Kett
 Robert A. Kevan
 Bernice & Charles C. Klosterman
 Barbara Kolb & Seymour August,
 in memory of Eric Konheim
 Susan & Bruce Konheim,
 The George Konheim
 Family Foundation,
 in memory of Eric Konheim
 Carol & Thomas M. Lamm
 Brian L. Larsen & Renae Kofford
 Rick A. Lawrence
 Anna L. Lawson
 Kathleen & Charles Lea, Jr.,
 in honor of Elaine LeBuhn
 Dhalia & Laurence C. Leeds,
 in memory of Eric Konheim
 Robert L. Lenzner,
 in memory of Eric Konheim
 John P. Linderman
 Ingrid A. Louisele
 Daniel B. Lucachick, Fluid Applied
 Construction Technology,
 in memory of Steve Lucachick
 Stefanie & KC Lyon, Nicole Miller,
 in memory of Eric Konheim
 Michael L. MacDonald,
 Mobil Wax Systems

Randy Michael Mastro &
 Jonine Lisa Bernstein,
 in memory of Eric Konheim
 Warren P. McNaughton
 Craig A. Melby (4)
 Audrey & Danny Meyer,
 The Summer Fund,
 in memory of Eric Konheim
 Nation Meyer
 Nicole J. Miller & Kim Taipale,
 Nicole Miller, Inc.,
 in memory of Eric Konheim
 Michael Moon
 Brett A. Nelson
 Bonnie & Joel Neymark
 Nike Foundation
 Northwestern University - SEED,
 in memory of Phil Semmer
 Allen J. Noveck,
 in memory of Eric Konheim
 Ed Nystrom
 Elise M. O'Shaughnessy
 Sally O'Connell
 Patricia O'Connor
 Avis R. Ogilvy
 Patricia & John Olds,
 in memory of Eric Konheim
 Michael Opitz
 Philip D. Pack,
 in memory of Eric Konheim
 Richard H. Peebles
 Polly Pierce, Dedham Land Trust
 Peter J. Powers,
 Powers Global Strategies, LLC,
 in memory of Eric Konheim
 Diana Prechter & Kent Cole
 Nan Puryear,
 Exquisite Apparel Corp.,
 in memory of Eric Konheim
 Letitia S.C. Quinn
 Jean G. & Dan I. Rather,
 in memory of Eric Konheim
 Arno & Carol Rayner,
 The Rayner Foundation
 John M. Richardson, Jr.
 Gwen Rodman
 Zella & Judith A. Rohrbaugh
 Abigail Rome,
 in memory of Eva Glaser

Hope & Paul R. Rudnick,
 Rudnick Family Foundation, in
 honor of Mr. and Mrs. Jordan
 Bittel's anniversary and in mem-
 ory of Mrs. Diane Sloves's father
 Anita E. Russel
 Ladd D. Rutherford
 Elyssa & Jack Schecter,
 in memory of Eric Konheim
 Judith Schector
 Daniel J. & Lisa A. Schreffler
 Sherman Selden,
 Pittsford Lumber & Woodshop
 Thomas Seymore
 Cloud N. Shadowshot
 Robyn Sheehan,
 Countryside Animal Hospital
 Dwight K. Shellman, Jr.,
 Shellman and Ornitz
 Carolyn & John Shurman
 Philip & Dorothy Silber,
 in memory of Eric Konheim
 Douglas J. Smith
 William & Rosie Smith, III
 Joseph & Sally Snyder, IV
 Robert H. Spence
 James Stevens
 Mary Wilder Stoertz &
 Douglas H. Green
 Alan J. & Gloria Gilbert Stoga,
 in memory of Eric Konheim
 Richard L. Sweeney
 Dennis & Sharon Sweitzer
 T.R. Winston & Co., Inc.,
 in memory of Eric Konheim
 Marjorie Thompson Duck
 Lee & Marvin Traub,
 in memory of Eric Konheim
 Beth B. & W. Henry Tucker
 Michael F. Uschold (2)
 Cheryl L. Vallone
 Eleanor Wasson (2)
 David Webb
 Susan & Seward Weber
 Douglas & Lynda J. Weiser
 Don R. Westbrook
 Margaret & William E. Westerbeck
 Bette J. & Perry R. Wilkes, Jr.

Jane Woodward & Kurt Ohms,
 in honor of the birth of
 Charles Long
 Stephen Young
 Barbara Zinn
 Robert Zirinsky,
 Ralph Zirinsky Realty Co.,
 in memory of Eric Konheim

ASSOCIATES

\$1 – \$99

Deanne L. Adams
 David Adamson, Eco Products,
 in honor of the GDS staff
 Philip Adiutori
 Adobe Matching Gift Program
 Edna & Niels T. Andersen (3)
 Sally Andersen
 Anonymous (22)
 E. Coury Armstrong
 Marilyn L. Arnold
 Jim Arnold, Jr.
 Diane & Wesley H. Bailey
 Victoria Balkoski & Paul Winkeller
 Michael Ballard
 Paul Barnes
 Paul Bartch
 Edna C. Bartlett &
 Katherine B. Gordon
 Rex L. Bavousett & Jan A. Moore
 Thomas A. Bell
 Barbara & Lyle E. Bergquist
 Marguerite P. Bierman
 George Blakey
 Jacqueline Bogard &
 Douglas James Bell, Jr.
 Sarah A. Bond
 Sylvia & Seymour Boorstein
 Robert E. & Emily S. Boyle, III
 Barbara Brahm (4)
 Renata & Gary J. Brand
 George Bremser, Jr.
 Richard R. Brigham &
 Sally E. Stapp-Brigham
 Louise Brodman,
 Edgewater Architects
 Katherine & Russell K. Brown
 Robert A. Brown
 Sheila Bryan

RMI Supporters

Alan T. & Susan Buckley
Douglas E. Burke
Kerry & Mary Burns
William D. Busick (4)
Steve & Rosalind Chapman
Jeff Chase
Cheryl A. Chipman
Robert Christy
Victoria & John F. Clancy
John Clark
Linda M. Clark
David Clark
Robert Cohen
David R. Conely
Sally & Joseph Conklin
Judy, Bruce & Erin Connery
Consolidated Manufacturing, Inc.
Matt & Grace D. Cormons
Timothy Costello
Janice & Darrell Coy
Wilson Craigie
Dwight Crandell
David Crawford
John Cummings
Charles W. Dahlgreen
Richard Darling
Cecile & Lawrence A. Davino
Andre DeBar
Carol, Edward, & Kelsie DeFrancia
Ruth & Dennis Demmel
Marilyn & Robert A. Derrickson, Jr.
Alison C. &
A. Gardner Dee DeWitt, III
Barbara Dibeler
Dee Dee Diccicco-Craft
Adrian Dronkert
Michael & Karen Durisin
William W. Durrell
Lloyd Eater & Terrie Frank Powers
Carolyn S. Eldred & Dennis E. Krug
Polly & John M. Ely, Jr.
Valerie J. Ericson
Diane C. Eskew
Kim & Marshall Evans
Eberhard Fahrnich
Michael Fancher
Dwayne R. Farley
Ralph Faust, Jr.

Avis & Jeff Fisher
James Fitzpatrick
Tad S. Foster
John & Julie Fox-Rubin
Roger France & Family
Ken Frankel
Mark Friedman (4)
Rich Garigen
Elizabeth & Paul D. Gehris
Constance & Al Getman
Alena Gilchrist,
City of San Francisco
Cheri A. Glaser
Leonore & Royal Glassman
Rafeal Gonzalez-Vizoso
Linda K. Good, Equinox Design
Renuka & T Govindaraj
Doug & Peggy Graybeal
Bobby Grayson
Tamara Greenlaw
Sadja Greenwood
Wesley A. Groesbeck
Roderick B. Groomes
Joyce & Charles Hackenyos
Charmaine & Kinard Haden
Chris & Curtis Hamilton
Coreen & Scott Hampson
John Handley
Terry D. Harbottle,
Global Business Network Canada
Barbara R. Hardy
K. Charles Hartranft
Kathy & Kurt R. Heilmann
Barbara J. Hibbard
Richard Hoenich (4)
Bonny & Dwight Holmes,
in honor of Douglas Holmes
Keith Honchell
John Hoskyns-Abraham,
Bullfrog Films, Inc.
Patricia A. Huberty
Cheryl & James Hunter
David W. Inouye,
Rocky Mtn Biological Lab
Mason Jensen (2)
Linda & Peter Jeschofnig
Baylor Johnson
Dana Judy & Susan A. Weisner

Debora & Keith Kaback
Mildred J. & Carl P. Keiser, Jr.
Lorna & Thomas R. Killian
Thomas E. Kimmel
Anne & Erik M. Kindblom
Dolores & Tarver A. Kitchens, Jr.
James B. Kless,
The Conservation Company
Walter I. Knausenberger
Andrew Kotila
Cathleen Krahe
Patricia & Douglas A. Kramer,
in honor of Trevor Kramer
Stephen G. Kuhn
Lorene T. Kuimelis
Jason Labranch
Lori & Mark C. LaCroix
W. Keith & Ellen S. Lain (2)
Jacque & Greg Lantz
David & Barbara T. Larson
Thomas E. Larson
Mary & Joseph M. Lechuga
Timothy Leddy
Richard & Nancy Leeds,
in memory of Eric Konheim
Maureen & Nick Lenssen
Marion & Warren P. Leonard,
Save Our World – VT
Nell F. LePla
Cathleen Leseten
Cheri & Dave Levenson
Ed & Susanne Lindgren
Gretchen Liuzzi
Kit Loekle
Patricia Logan & Karl Citek
Jean Ludtke
Margaret & Daniel S. Lynch
Ann MacLeod & Karen A. Signell
Russell Malley & Tynka L. Dees
Craig S. Mankowski
Miriam & William A. Marshall
Thomas & Jane Matson
John McClaughry,
Institute for Liberty
Sarah S. McCoy
James R. McCrea
Laurie & Craig McDaniel

Allen McKenzie,
AJM Design Group, Ltd.
Allison & Michael Thomas
McPherson
Madeline McWhinney Dale
Marcus Mello,
in honor of Aldo Leopold
Fernando Mendez
Sylvia & Sam Messin
Harry Morel (2)
V. Joe Morice
Suzanne & Donald Morrison
William L. Morton
Gaard Moses, Gaardgraphic
Byard W. Mosher, IV
Georgeann Moss
Jeanne Mueller
Steffen Mueller
Jacqueline A. Neurauder
William H. Newlin
Daniel Nichols
Genevieve & Morris J. Nicholson
Michael Nidel
Wendy & John Dirk Nordberg
Jeannette & Robert Nordham
Jennifer L. & Philip O. Nubel

Wills

Below is suggested wording for including RMI in your will. But we suggest you consult with your attorney.

“I hereby leave _____ percent of my estate (or a fixed amount, specific property or the remainder of my estate) to Rocky Mountain Institute, a Colorado nonprofit corporation, whose purpose is to foster the efficient and restorative use of resources to make the world secure, just, prosperous, and life sustaining.”

William S. O'Donnell, Jr.
 Patrick Olson
 Joseph & Joyce O'Neil
 J. Oosterlinck
 Douglas Porter Owen
 Richard Paget
 Bill & Tina Palmisano
 Virginia M. Parker
 Mary Alyce Pearson
 Clayton Pederson
 Jennifer Penney
 Jane Peters,
 Research Into Action, Inc.
 Jerome Petersen
 Donna M. Petrangelo
 Diana & Gary G. Phelps
 Edith & Steven J. Pierce
 John Platt & Lisa Heilbron
 Neil & Melody Preister
 Carol & William R. Price
 Richard M. Puskar
 Nan & Andrew Quiroz
 Kyra Raphaelidis,
 in honor of Janus Raphaelidis
 and Wendy Morris
 Janus Raphaelidis &
 Wendy Lynn Moore
 Joseph E. Reid
 Philip B. Reinhart
 Tom Ribe
 Lawrence M. Rice
 Janine Rickard
 Leonard Rifas & Mizue Fujinuma,
 Educomics
 Linda M. Rightmire
 Richard Riseling,
 Apple Pond Farming Center
 Robin & David S. Rittenhouse
 Alison A. & Richard R. Roach,
 in memory of Phil Semmer and
 Eleanor Velie
 Bob & Sylvia Robertson
 Clay Rockefeller
 Marietta & Pier Luigi Rosellini
 Scott Roth
 Martha Rounds & William Manning
 Mark Rousseau & Leslie Wells

Sarah Rubin
 Stuart Rucker
 Monica L. Russell
 H. John Russell
 Elisabeth K. Ryland
 Renata E. Sack
 Catherine I. Sandell
 Rob Sargent
 Teresa M. Schader (2)
 Mark Schlanger
 Marlene W. &
 Raymond H. Schneider
 Stan Schoen &
 Barbara S. Day-Schoen
 Robert Sculthorpe,
 Arxx Building Products
 William L. Seavey
 David G. Sebek
 Rosemary Senn
 Mark Shaffer, Ventec
 David Shakespeare
 Joan & Charles A. Shapiro
 Marcia Shull
 Sidney H. Simon,
 The Simon Family Trust
 Chantal Simonpietri
 James R. Simpson
 Walter Simpson &
 Nancy Lampka Simpson
 Julie Slagle
 Joy Sleizer
 Scott Smith
 Catherine R. Smith
 Charles J. Smith
 Janet M. Smith
 George A. Smith
 Nicholas Sofios
 John SomdeCerff
 Gail & Gregory C. Speer
 Geraldine St. Onge
 Galen Staengi
 Employees of the Town of
 Herndon, VA (2)
 Elaine V. Stannard
 Dorothy & Clarence Stearns
 Karen & Donald Stearns
 Gary Steinberg
 Glenn Strong



We also want to thank those individuals who have contributed to RMI through Earth Share, the combined federal campaign, and other workplace charitable programs. If you would like to have RMI as a charitable option in your workplace campaign, please contact our Development Department (970-927-3851).

Robert Sultzer
 Roger F. Thoma
 Donald K. Thompson
 Toki & David C. Thompson
 Erin M. Thornley & Joseph T. Parisi
 John Tilton, Paperbacks Plus
 Charles J. & Rhoda Transue
 Terry & Gary Trauner
 Stephanie Truesdale
 David Tupper
 Ann & John B. Vautour
 Wade Vernon
 Nancy & Tom Vineski,
 Alternatives Solar Energy
 William Von Lackum, II
 Jane Walker Pfister
 Josephine & Eugene Walkowiak
 Janice Wall, in honor of Don Wall
 Janelle & Gary J. Walter
 Richard C. Walters
 George H. Wear
 Nicholas Weber
 Wendy & Richard Weeks
 Scott Westbrook
 Gerald R. Whitcomb
 Eric White
 Osgood & Barbara Whittemore
 Geoffrey Wickes
 Michael Wiggen
 Marianne Williams
 Jonathan Wood
 Barbara Wylan
 Carolyn Yagle
 Paul Young
 Gregory Zahradnik
 Stephen Zeller
 Jeanine Zeman
 Jon Zuder, Arcade Productions

WINDSTAR LAND CONSERVANCY DONORS

Jill Armitage
 Grace & Bryan T. Bailey (3),
 in memory of John Denver
 Christine Behl
 Annalisa Berns
 Annalisa M. Berns,
 in memory of John Denver
 Ellen Bigelow
 Victoria Conti
 Fran Edwards
 Sarah Garrett
 John T. Getz,
 in memory of John Denver
 Marina Green
 Suzanne Hotaling
 Vicky Huerth
 Beth Huss
 Inge Kaminski
 Joan Kurtz
 Gabi Kuss
 Mary Jane Maas
 Jana McAlpin
 Ann Marie & James McCrone,
 in memory of Rita and
 John Mulvihill
 Kyle Osborne
 Gary Phelps
 Patricia & Ronni R. Ridenour,
 in memory of John Denver
 Corrine Smith
 Pamela D. Tate
 Diane Tinker
 Julie & Kelvin Townsend,
 Hearts in Harmony,
 in memory of John Denver
 Debbie Walt
 Mary L. Warren
 Marjorie Sue Wells,
 in memory of John Denver
 Noel Whearty
 Rita Zalucha

Big and Green: Projects

PEKING UNIVERSITY,
CONTINUED FROM PAGE 4

Unique challenges: The college is hoping to be very innovative with water and wastewater, and it hopes to have many of its components (PVs, turbines, etc.) manufactured in China. Also, it's near the university's East Gate, in a very visible location. Add to that the fact that China has little modern green building design experience, and you've got a very gutsy jump into green design (like David Orr's endeavors at Oberlin, only twenty times bigger). It is intended to be a demonstration building for the Chinese Olympic officials preparing for the 2008 summer games in Beijing.

RMI's involvement: RMI has been advising on green facilities design, and recently participated in the Beijing charrette.

David Lawrence Convention Center

Location: Pittsburgh

Architect: Rafael Viñoly
and Burt Hill Kosar Rittelmann

Size: 1.2 million square feet

Year: 2003

Client: Greater Pittsburgh Convention
Services Department

Description/what's special:

This building is the biggest naturally-ventilated and daylight exhibit hall in North America (see <http://www.planpittsburgh.com/conventionCenter/greenBuildingBenefits.asp?p=2>). It's important because its remarkable green features are also wonderful form-givers — the green "features" aren't merely tacked on. By mimicking the "Three Sisters," three suspension bridges that span the Allegheny River, architect Viñoly chose a beautiful curvilinear shape that would be both beautiful and conducive to natural ventilation and natural lighting.

Unique challenges: An important downtown location. (Designers are aiming for a LEED gold rating.)

What has it shown/proved/ done well?

Saved energy. In fact, Pittsburgh officials estimate a 30–50 percent energy saving worth hundreds of thousands of dollars.

RMI's involvement:
Sustainability consultant.

California Academy of Sciences (CAS)

Location: San Francisco

Architect: Renzo Piano Building Workshop

Size: 250,000 square feet

Year: The building is in design now (see p. 19).

Client: CAS

Description/what's special:

The Peking University building described above is certainly complex enough, but the new CAS facility will have a planetarium, an aquarium, a rainforest, storage for eighteen million natural history specimens, and conventional exhibit space. The most attractive part of this building is the great big rolling green roof, and the re-creation of the location's original landscape.

Unique challenges: Being created for one of the oldest scientific institutions in California, this building has to reflect the public's desire for scientific information in understandable formats. (Designers are aiming for a LEED platinum rating.)

If built, what will it show/prove/ do well?

There is talk of employing photovoltaics as a huge shade screen that extends all around the building. The latest design estimates are that it could produce 350 kW of electricity, but those are subject to change.

RMI's involvement:
Sustainability consultant.

The 'Big & Green' Road Show

As part of RMI's ongoing effort to promote and cultivate green building projects, RMI's Bill Browning last fall contributed to the creation of an exhibit at the National Building Museum based on Gissen's book (Big & Green). The show, which ran from January through 22 June and will now go on the road to seven major cities, depicts selected big and green buildings around the world. For more information, please visit www.nbm.org/Exhibits/current/Big_and_Green.html.

RMI Solutions

RMI Solutions is published three times a year and distributed to more than 10,000 readers (by mail and online) in the United States and throughout the world. © 2003 Rocky Mountain Institute. All rights reserved.

LETTERS TO THE EDITOR

We want to hear your comments.
Please address all correspondence to:

Cameron M. Burns, Editor
Rocky Mountain Institute
1739 Snowmass Creek Road
Snowmass, CO 81654-9199
tel: (970) 927-3851
fax: (970) 927-3420
newslet@rmi.org
www.rmi.org

For reprint permission, please contact newslet@rmi.org. As a leader in promoting resource efficiency, RMI supports innovative recycled paper manufacturers. This publication is printed on New Leaf EcoOffset (100% post-consumer waste, processed chlorine-free) using vegetable-based ink. Contact New Leaf Paper for more information, 1-888-989-5323. No new trees were used in the production of this newsletter, and we offer paperless electronic delivery via our website or on request.

ABOUT THE INSTITUTE

RMI is an entrepreneurial nonprofit organization that fosters the efficient and restorative use of natural, human and other capital to make the world secure, just, prosperous, and life sustaining. We do this by inspiring business, civil society, and government to design integrative solutions that create true wealth.

Our staff shows corporations, communities, individuals, and governments how to create more wealth and employment, protect and enhance natural and human capital, increase profit and competitive advantage, and enjoy many other benefits — largely by doing what they do more efficiently.

Our work is independent, nonadversarial, and transideological, with a strong emphasis on market-based solutions.

Founded in 1982, Rocky Mountain Institute is a §501(c)(3)/509(a)(1) public charity. It has a staff of approximately 50. The Institute focuses its work in several main areas — business practices, climate, community economic development, energy, real-estate development, security, transportation, and water — and carries on international outreach and technical-exchange programs.

What Are You Doing? Greg Kats

CONTINUED FROM PAGE 17

until 2001. It has become the national standard in almost all energy efficiency projects where contractors are paid for measured energy savings, and has helped sharply cut the cost of energy efficiency financing. The protocol has been key to over \$5 billion of investments in comprehensive energy and water savings, and has been translated into ten languages (www.ipmvp.org).

“The energy efficiency industry was stuck because you couldn’t get financing or it was too expensive,” Greg says. IPMVP established best-practices standards and made it clear that the savings would reliably be there. This made people much more comfortable investing in efficiency and using the savings as collateral. “In other words,” he said, “they were saying, ‘Yeah, we now believe the energy savings, the water savings will be there, and therefore we’re going to fund (and at lower rates) based on that,’ rather than saying, ‘We don’t have confidence in energy efficiency investments, so we are going to charge high interest rates and use your company’s balance sheet as collateral.’”

Greg is now a principal in the **Capital E Group**, a top Washington DC consulting firm in distributed energy and the clean energy industry, where fellow-RMI-alum Joe Romm (having risen to Acting Assistant Secretary of Energy) is also a principal. Capital E advises

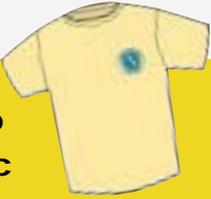
corporations (many among the *Fortune* 100), states, and agencies on deploying energy efficiency technology.



Greg was lead author of the first rigorous analysis of the cost and financial benefits of green buildings. The report,* for more than forty state agencies, shows the financial benefits of green buildings exceed costs by ten to one, and has already influenced the California Board of Regents to decide that all future California university system buildings will be green. Greg is involved in research, writing, and consulting seeking the best ways to deploy green building and energy technologies. Capital E also works with startup companies, helping find ways to raise capital and ways to get products to market sooner. In addition to his day jobs, Greg has served on dozens of advisory boards. He’s currently chair of the **Energy and Atmosphere division of LEED™ (Leadership in Energy & Environmental Design)**, the national green building rating system developed and administered by the U.S. Green Building Council (with help from RMI). He’s also co-chair of the finance committee of the **American Council for Renewable Energy (ACRE)**, an advocacy organization that aims to bring renewable energy into the mainstream of the American economy and lifestyle. But his current work isn’t quite as exotic as some jobs he held in the 1980s.

Greg’s advisory role with the Hungarian Parliament came just after the end of communist rule. The government had set energy budgets specifying levels of consumption that were supposed to be met.

“In other words, they had a culture of energy waste,” he said. “And I was able to help them think about putting in place new legislation to promote energy efficiency and understand that energy efficiency was consistent with economic competitiveness.”



**RMI logo
organic
cotton
T-shirts, EcoSpun®
(recycled P.E.T.)
fleece vests, hooded
fullzip sweatshirts,
and recycled-fiber
tote bags are
on sale now!**

**To find out more
about RMI stuff,
e-mail us:
orders@rmi.org
or call:
970-927-3851**

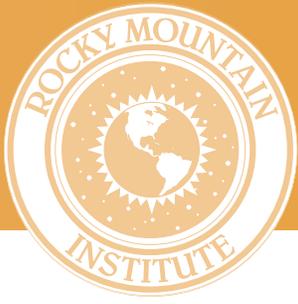
**To find out
about publications
for sale visit:
[www.rmi.org/store/
pid385.php](http://www.rmi.org/store/pid385.php)**

Greg has forged a career of distinguished achievement in Europe and Washington DC, advancing energy efficiency, distributed generation, and clean energy. But he said he harbors a little envy for those of us who work in places like Old Snowmass.

“RMI is inspirational, both intellectually and in terms of its physical beauty,” he said, “which reminds us why we do this kind of stuff. [It reminds us] that man, absent the environment, doesn’t exist, and that we bear a responsibility to maintain the environment for future generations. We’re reminded of that in a place of beauty.”

—Jeremy Heiman

*The Costs and Financial Benefits of Green Buildings, a report to California’s Sustainable Building Task Force, Oct. 2003, www.cap-e.com/publications.



ROCKY MOUNTAIN INSTITUTE / VOLUME XIX #3 / FALL-WINTER 2003

RMI Solutions

NEWSLETTER

Features

- 1 **Big and Green**
- 5 **Enlightening Blackouts**
- 7 **Ecology is Free**
- 10 **Envisioning a Sustainable Vancouver**
- 12 **Exploring Vancouver Island's Energy Future**
- 14 **Greening the Grocer**

In Every Issue

- Life at RMI **16**
- Editor's Notes **16**
- What Are You Doing? **17**
Greg Kats, *Capital E*
- Staff Spotlight **18**
Red Cain, *RMI Maintenance Department*
- Other Voices **19**
California's New Academy of Sciences
- Board Spotlight **22**
Brian Rosborough
- Donor Spotlight **23**
Bud Konheim
- RMI Supporters **24**
- RMI in the news

Rocky Mountain Institute
 1739 Snowmass Creek Road
 Snowmass, CO 81654-9199

CHANGE SERVICE REQUESTED



NON-PROFIT ORG U.S. POSTAGE PAID PERMIT #143 GRAND JCT, CO
--