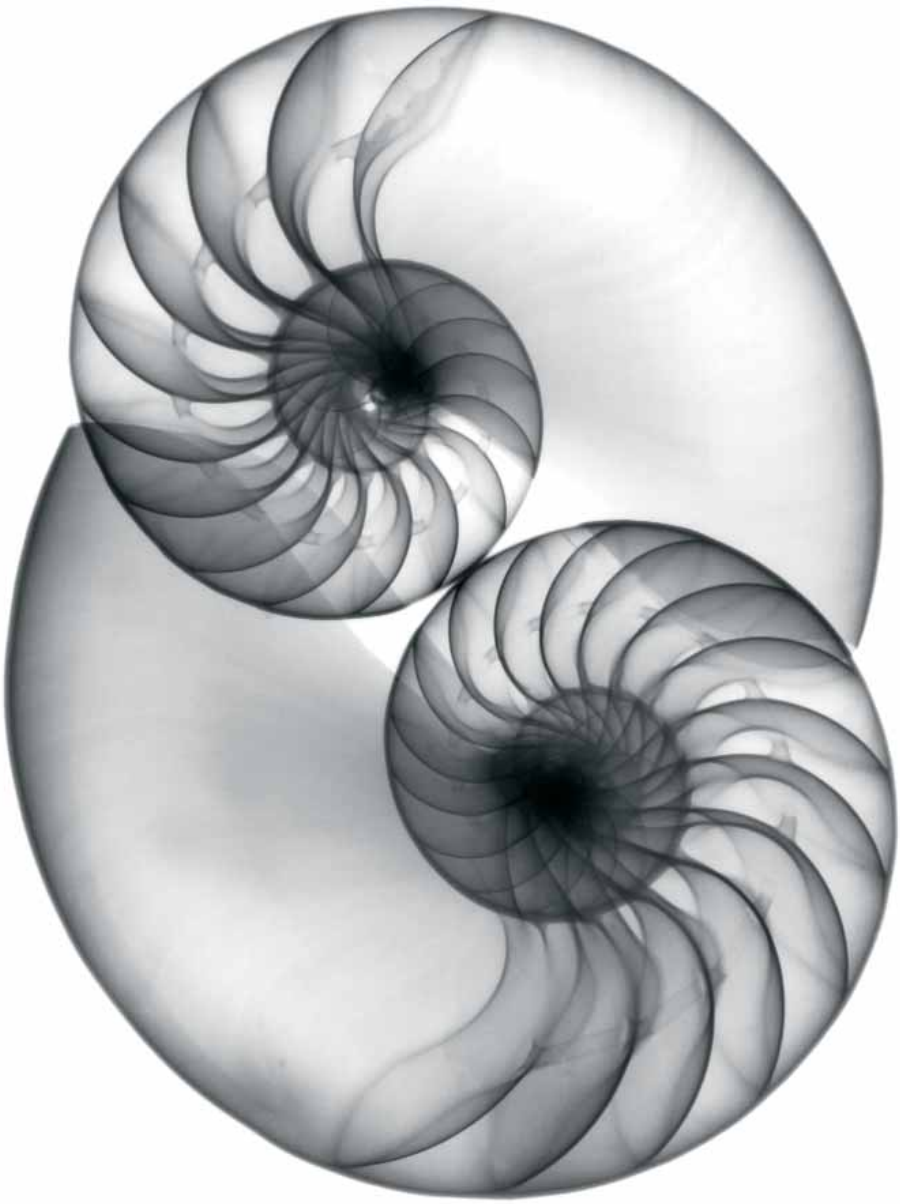
Abundance by Design



Rocky Mountain Institute

Annual Report 2004–2005

Abundance by Design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IN AUGUST 2004, WHILE helping visionary developer Tatsuo Akimura articulate themes for his Kobunaki eco-village near Osaka, I thought of a phrase—"abundance by design"—that encapsulates not just his project but what we do at Rocky Mountain Institute.

Abundance is the opposite of scarcity. It substitutes sufficiency for privation, contentment for envy, tranquility for conflict, synergy for tradeoff. Just as waste spawns scarcity, elegant frugality fosters abundance. RMI creates abundance by wringing far more benefit from energy, water, materials, and other resources, and showing people how to do more and better with less for longer. We reveal how to meet the needs of a secure, just, prosperous, and life-sustaining world not by felling the last tree and catching the last fish, not by scraping the bottom of the barrel from the ends of the earth, but by innovative design, rigorously applied and vigorously promoted.

Design is the alchemy of purpose into artifact. It translates intention into action. Bad, *dis*-integrated design causes many of the world's problems, boosting cost, complexity, and inefficiency. RMI aims to make bad design unmarketable. In buildings, vehicles, and very diverse sectors of industry, redesigning roughly $20 billion worth of facilities in recent years, RMI optimizes whole systems for multiple benefits and "tunnels through the cost barrier," turning diminishing into expanding returns. Often such holistic designs are inspired by "biomimicry" (p. 10).

Efficient and restorative use of resources is part of RMI's broader vision of "natural capitalism" (www.natcap.org). Natural capitalists also manufacture the way nature does, with closed loops, no waste, and no toxicity; adopt business models that reward these shifts; and reinvest profits into natural and human capital. RMI's practice integrates all these elements into a new way of doing business that's alluringly profitable—largely because efficiency costs less than the resources it saves. This turns seeming burdens like oil-independence and climate protection into keys to wealth and competitive advantage. To quote Martin Melaver (a Georgia green developer), the buck starts here.

RMI's *jūjitsu* spreads "abundance by design" by redirecting the unmindful market forces that drive wealth-destroying depletion, destruction, and pollution. Our experts help early private-sector adopters of natural capitalism, especially of radical energy and resource efficiency, achieve conspicuous success so their rivals must follow suit or lose share. This competition implements and refines concepts while earning consulting revenues that cover most of the Institute's costs. Such "applied research" simultaneously carries out our mission, funds research, leverages grants and donations, and creates rapid learning, immediate practical application, teachable cases, credibility, and effectiveness. In collaboration with many partners, it's starting to make "abundance by design" the engine of the next industrial revolution.

Our latest and largest application is *Winning the Oil Endgame* (www.oilendgame.com). This independent, peer-reviewed synthesis demanded extraordinary commitment, effort, and sacrifice, and the five primary researcher/authors drew on the skills and time of everyone in the Institute. But it was worthwhile and timely. Our study presented the first solution that makes sense and makes money—a detailed roadmap for *eliminating* U.S. oil use, more cheaply than buying oil at half today's price. Now we're starting a three-year, nearly $4-million effort—the most ambitious we've ever undertaken—to turn these findings into reality (pp. 4–5).

That's part of a disciplined Institute-wide effort to go beyond merely articulating clear, practical, profitable solutions. More and more, we'll make them actually happen, with accountability, feedback, rapid learning, and wide outreach-by-example. The fiscal year from mid-2004 to mid-2005, reported herein, has brought encouraging progress toward deeper and wider implementation, which our new strategic plan will intensify. In short, we're designing and executing new ways to make our ideas self-evident, ubiquitous, and…well, abundant.

To all our companions and supporters in this journey, and to the Trustees and colleagues who carry its burdens, I am deeply grateful.

AMORY B. LOVINS

RMI's Bridge Construction: People at Work

In last year's annual report, I described our efforts in "building a bridge to RMI's future" based on findings from our planning sessions with advisors, Trustees, friends, and colleagues. In mid-July 2005, we finalized a business plan for RMI's Research & Consulting division that incorporated and expanded upon those findings. The plan lays out stages for the solid and permanent construction of the bridge that ensures RMI's future viability and effectiveness.

With approval of the business plan by our Board, we have commenced bridge construction with serious and immediate capacity-building for our Research & Consulting ("R&C") group. First, we promoted Dr. Joel Swisher, PE from leadership of the Energy & Resources Team to the position of R&C Managing Director. Former Managing Director Kyle Datta has been named R&C Senior Director and works across all teams with project and business development. From August 2005, long-time friend and colleague Greg Franta, FAIA leads our RMI/ENSAR Built Environment Team, which includes several staff members from Greg's firm ENSAR. This new name for our former Green Development Services group reflects significant new skill sets that increase the depth and breadth of RMI's ability to tackle a variety of opportunities in the built environment.

In September 2005, we also welcomed two senior practitioners: John Anderson, PE, our new Energy & Resources Team leader, and John Waters, our new Integrative Design Team leader. John Anderson brings more than twenty-five years' experience in the energy sector—including a successful career with the National Renewable Energy Laboratory and its predecessor, the Solar Energy Research Institute (SERI)—to RMI's work in energy resource investment strategies, carbon management, and distributed resource program design and evaluation. Engineer John Waters brings more than twenty years' experience in product development and manufacturing at General Motors and Delphi. His experience will complement the skills of our Integrative Design Team members as they develop RMI's methodology in whole-system design and apply it across resource-intensive industries, primarily at the manufacturing and facility level. With this senior leadership in place, we will continue to build an excellent line-up of project managers and to support rising stars within these teams that take our work into the world.

One of the reasons RMI has had such an early success in capacity-building is the work of our first professional human resources director. We are serious about retaining and supporting the remarkable staff RMI has been able to attract. Dr. David Rothstein, our new HR Director, is therefore improving our personnel policies and professional development goals and strengthening all the foundations of organizational maturation and growth.

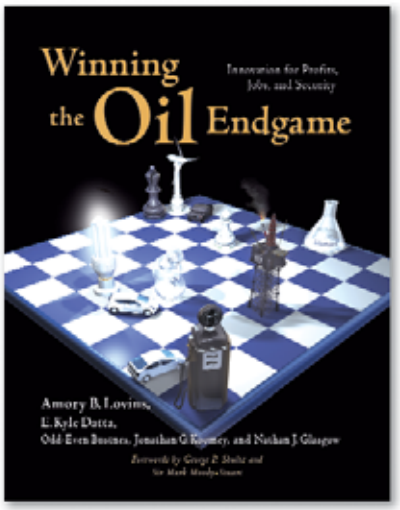
This gratifying increase in capacity comes at an opportune time in the life of the Institute, as it steadfastly proceeds to implement one of its most important pieces of work—*Winning the Oil Endgame,* (pp. 4–5). We are committed to this bold and timely project that blends so closely with our other work, both strategically and substantively. With the new hands and minds buttressing RMI's already able Research & Consulting group, we look forward to the coming year. Certainly, we will have the strength to meet the challenge of our mission.

Martha C. Pickett

Winning the Oil Endgame

IN 2002–03, ROCKY MOUNTAIN INSTITUTE saw the "avoidable oil crisis" we'd been warning about for decades becoming imminent, so we launched a detailed effort to discover how much U.S. oil use could be profitably saved or displaced. The answer: *all*, cheaper than buying oil for $26 per barrel (the U.S. government's 2004 forecast of world oil price in 2025, all in year-2000 $).

In 1850, whaling was one of America's largest industries, and whale-oil lamps lit most homes. But as whales became shy and scarce, whale oil prices elicited competitors that grabbed more than five-sixths of that lighting market in the nine years before Drake struck oil in 1859. The inattentive whalers were astounded. Oil is now poised to repeat that history.



A nearly two-year and million-dollar effort by five RMI coauthors, scores of staff, and hundreds of peer reviewers and advisors showed how. On 20 September 2004, RMI published its oil solution: an independent, comprehensive 319-page study of *how to get the U.S. completely off oil and revitalize the economy, led by business for profit.*

By the 2040s, we found, the U.S. could redouble its efficiency of using oil (already doubled since 1975) at an average cost of $12 per saved barrel. At an average cost of $18 per barrel, saved natural gas and advanced biofuels (mainly ethanol made from woody, weedy plants like switchgrass and poplar) could replace the rest. The best technologies in or entering commercial service in 2004 could profitably triple the efficiency and improve the safety of cars, trucks, and planes, with all the size and performance officially projected for 2025.

The transition would require a $180-billion investment—half to retool the car, truck, and plane industries, half to build an advanced biofuels industry. Returns by 2025: $155 billion annual gross savings, $70 billion annual net savings, a million new jobs, a million existing jobs saved, 26 percent lower carbon dioxide emissions, and a safer world, all driven by business logic. Aligning public policy would make the transition faster, smoother, and less risky—without fuel taxes, subsidies, mandates, or new federal laws.

A year ago, we launched *Winning the Oil Endgame* at the National Press Club, Resources for the Future, the National Defense University, the Center for Strategic and International Studies, and the Council on Foreign Relations (whose Energy Security Group chairman called it "one of the most important energy studies in decades"). So what's happened? More than 150,000 people have visited www.oilendgame.com; many have downloaded the book gratis. Web posting of all sources and spreadsheets forestalled analytical challenges. The study's apolitical content and tone, eloquent forewords by George Shultz and former Shell Chairman Sir Mark Moody-Stuart, and cosponsorship by the Office of the Secretary of Defense and the Chief of Naval Research all broadened credibility. *Winning the Oil Endgame* was featured in the *Wall Street Journal* (by President Reagan's National Security Advisor, Robert C. McFarlane), *Fortune*, *Time* ("one of the best analyses of energy policy yet produced"), *Newsweek International*, BusinessWeek Online, *Ripon Forum*, and *Worth*; favorably covered by the *Economist*, *New York Times*, *Los Angeles Times*, *Daily Telegraph*, *Foreign Affairs*, *MSN Money*, and others; and presented to more than forty important industry, policy, and scientific conferences. There's growing political interest at national, state, and international levels. And the message is resonating strongly with its intended audiences—business and military leaders.

Since launch, problems in both the Persian Gulf and the Gulf of Mexico have boosted oil prices and heightened the need for dramatic technological and policy innovation. Most Americans realize that a country that uses 25 percent of the world's oil, produces 9 percent, and owns 2 percent can't drill its way out. Now comes the hard part: playing the oil endgame to win.

Our proposed policies are novel, light-handed, and market-oriented. For example, at our suggestion, the District of Columbia has adopted the functional equivalent of a "feebate"—making efficient vehicles cheaper and inefficient ones costlier (best done in each size class), so buyers consider lifecycle fuel savings, not just the first 2–3 years' worth. This illustrates how states can innovate without federal leadership or hindrance. But the main leadership will come from business.

At mid-2005, RMI's "off-oil" team was refining a three-year, $4-million plan to tweak precise

"trimtabs" in heavy trucks, military procurement and R&D, automaking, fuels (oil, gas, and biofuels), and finance, to head the U.S. irreversibly off oil. This effort has shown promise even from its first weeks. In heavy trucks, for example, RMI is creating demand for tripled-efficiency models by facilitating conversations between major fleet operators and their suppliers. The prize is a 60 percent Internal Rate of Return and doubled margins for a typical big hauler—but until we told them, the customers didn't know how. More know now (others will soon), and they're very attentive.

Meanwhile, there's encouraging interest in the Pentagon. A respected military think-tank reviewing our study concluded: "[A]ggressively developing and applying energy-saving technologies to military applications would potentially do more to solve the most pressing long-term challenges facing DoD and our national security than any other single investment area." But the win can be even greater. Just as DoD's R&D created the Internet, GPS, jet engines, and microchips, it could speed advanced materials, transform the car, truck, and plane industries, and lead the country off oil altogether so DoD needn't fight over it.

After mid-2005, progress accelerated further. In August, the National Highway Traffic Safety Administration tentatively adopted our recommendation to base future light-truck efficiency standards on size, not weight, thus encouraging advanced materials that decouple the two so big cars become light but safer. By September, a *Wall Street Journal* news story, *Financial Times* editorial, and major automakers had concurred on lightweight safety, while our senior discussions intensified in Detroit on how new materials (see below) can save oil, lives, *and* money. Our invited testimony before 11 members of the Senate Commerce Committee helped broaden their vision. And in October, we co-organized a New York conference to engage Wall Street with new investment opportunities.

Three years hence, we hope to report that oil has begun its inexorable, decades-long, market-driven journey to emulating the obsolescence of whale oil—to the benefit, we predict, even of oil companies.

RMI's Automotive Innovation

In 1991, cofounder Amory Lovins invented the Hypercar® concept—ultralight, hybrid-electric, ultra-low-drag vehicles with highly integrated, radically simplified, software-rich design—and in 1993, put the concept in the public domain so nobody could patent it. The resulting competition leveraged RMI's $3-million R&D investment by roughly 3,000-fold, helping to stimulate today's hybrid-electric vehicles.

In 1995–96, RMI's Hypercar Center assessed potential volume production, and in 1998, with 17 industrial partners, commissioned a Lotus Engineering feasibility study that spawned RMI's fourth for-profit spinoff—an automotive engineering firm.

The spinoff team and a leading European automotive engineering firm designed a quintupled-efficiency carbon-fiber mid-size SUV concept car, production-costed and competitively manufacturable.* When niche production hopes were dashed by the late-2000 collapse of the technology capital market, the team persevered, and the work took a new twist.

By 2002, automakers familiar with the SUV design were eager to make carbon-fiber ultralight cars, but lacked an affordable manufacturing process. In mid-2003, led by former Hypercar Center engineers Dr. Jon Fox-Rubin and Dave Cramer, the team opened an engineering development center in Glenwood Springs, Colo. Their innovative manufacturing process, whose umbrella patent issued in August 2003, quickly emerged as a promising candidate to bring RMI's automotive concept to market, perhaps as early as 2010.

FIBERFORGE

Soon the spinoff was doing business as Fiberforge® (www.fiberforge.com), commercializing its process for making cost-competitive thermoplastic advanced-composite structures. By mid-2005, this small firm was widely considered a leader in North America. Fiberforge's process can halve a vehicle's weight and fuel use, at no extra cost (because simpler automaking and smaller propulsion system pay for the costlier materials), and with improved safety (because such composites can absorb up to 12 times as much crash energy per pound as steel). Fiberforge won a World Technology Award in 2003, as RMI's auto concept had done in 1999.

Fiberforge is selling samples, prototype parts, and development services to automakers and Tier One automotive suppliers, among others. Financed by private "angel" investors, foundations, and an RMI capital loan, it's growing rapidly toward profitability. Its success would offer automakers and suppliers worldwide the key missing technology to fulfill RMI's 1991 vision of the biggest automotive gamechanger since Henry Ford's *Model T*—equivalent in U.S. oil savings to discovering a Saudi Arabia under Detroit.

* www.rmi.org/sitepages/pid175.php#T04-01

Looking Forward to Carbon Limits?

JUST TWENTY YEARS AGO, THE NOTION OF trimming greenhouse gas (GHG) emissions, notably carbon dioxide, was barely on a typical utility's radar screen. And if it was, it was generally a byproduct of calls to trim pollution and the acid rain, visual blight, and asthma that came from burning coal. In the mid-1980s, many utilities installed flue gas desulfurization units (a.k.a. "scrubbers") and soot-capturing filters, then went back to business as usual. Global climate change seemed to most an academic speculation.

How things change. Today, every forward-thinking utility is acutely aware that the electricity industry's emission of 39 percent of U.S. carbon dioxide is its single most important environmental challenge—and carries a heavy price tag as fuel costs rise. With power generators a crucial part of the global fight to trim emissions, RMI's broad energy expertise and engagement have lately refocused on more climate-safe, clean, resilient, and cost-effective ways to provide electrical services.

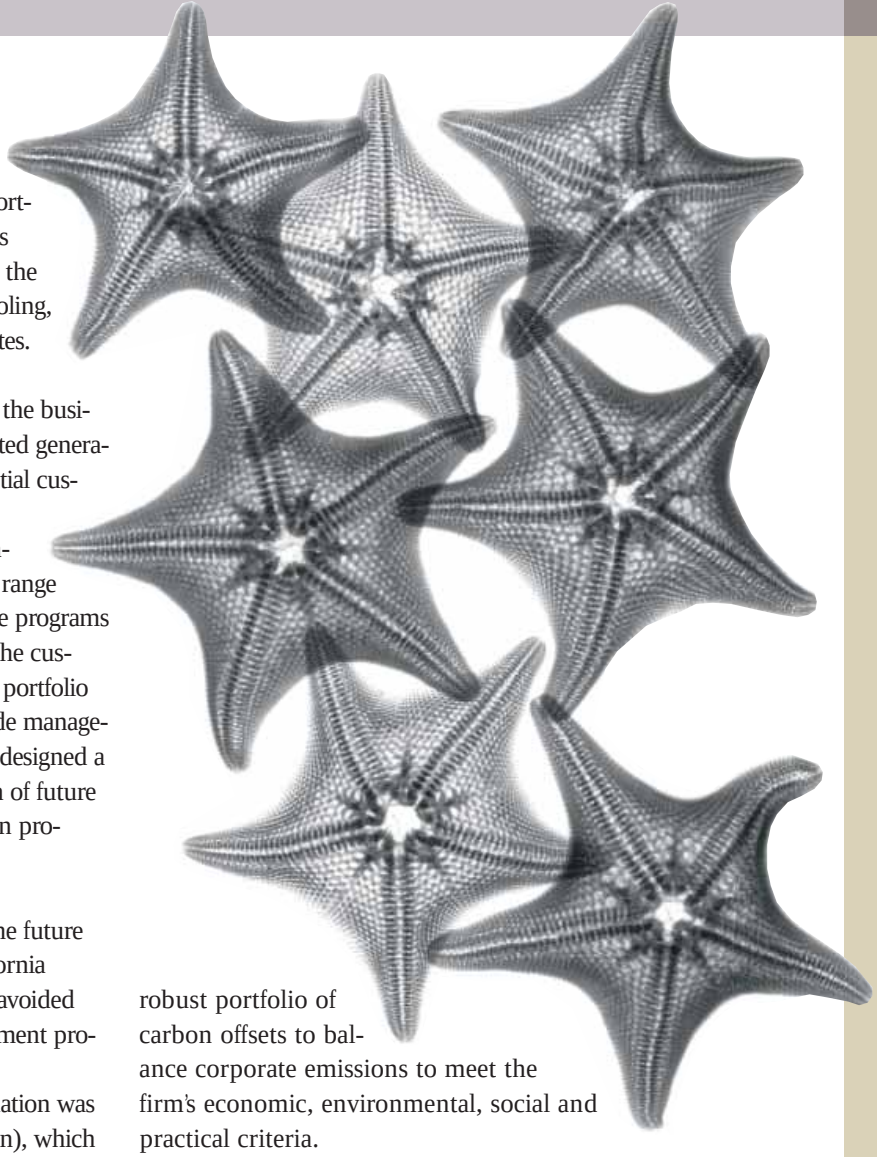
Today's increased awareness of climate change coincides with the flowering of parallel revolutions in technology, business models, and public policy that RMI has been helping for decades to create. Utilities today enjoy a broad suite of creative and attractive new options: generating electricity more efficiently, generating it at the right place and scale (distributed generation), using it more productively (end-use efficiency), balancing the peaks and valleys of consumption (demand response), "firming" wind- and solar power so they're available when needed, estimating inventories and investing in reductions of greenhouse gas emissions, and even educating forward-thinking financiers and customers about emerging carbon taxes and trading regimes.

These days, RMI's Energy & Resources Team draws on its longstanding thought leadership in these areas to help utilities plan and manage energy supply- and demand-side resources, and to understand the new constraints and opportunities of greenhouse gas limitations. During the past year, much of our energy work—complementing related "off-oil" work (pp. 4–5)—applied cutting-edge thinking to utilities' unique challenges. This work has relied on research and implementation grants from the Hewlett and Luce Foundations, as well as on consultancies for utility clients. With Hewlett and other foundation support, we have also developed important new intellectual capital, including, in June 2005, the first compilation of the actual size and speed of deploying decentralized low- and no-carbon power sources worldwide. (Surprisingly, they turned out to be bigger and far faster-growing than nuclear power.) We also completed much of an in-depth assessment of the latest demand- and supply-side opportunities in natural gas; made RMI's operations carbon-neutral through efficiency and trading (as an Associate Member of the Chicago Climate Exchange); and advised some major energy users, such as the Stanford Linear Accelerator Center, on cutting their energy costs and GHG emissions.

Those emissions will long remain a major global challenge, but RMI's innovative strategies and technologies are already showing new paths to practical, advantageous solutions for utilities and other major energy firms.

During mid-2004 to mid-2005, highlights of the Energy & Resources Team's work included:

• Assisting the implementation of Energy Resource Portfolio Planning for the City of Palo Alto Utilities. RMI's ongoing role in the CPAU planning process involves reviewing the current electric resource plan, designing economic criteria for efficiency programs, prioritizing efficiency program strategies, evaluating the potential for local energy resource options, and



helping to integrate supply and demand-side options into risk-managed, least-cost portfolios. The local resource evaluation includes detailed modeling and economic analysis of the potential for distributed tri-generation of cooling, heat and power at specific large customer sites.

• Helping Great Plains Energy develop the business case for demand response and distributed generation programs with commercial and residential customers of Kansas City Power & Light Company. RMI evaluated the available technologies and available products, reviewed a range of proposed program designs, prioritized the programs in terms or potential impact, and analyzed the customer cash flows and utility economics of a portfolio of programs. RMI also provided demand-side management technology and program reviews and designed a strategy to collect data to support evaluation of future load management and distributed generation programs.

• Developing an approach for defining the future value of GHG emissions as part of the California California Public Utilities Commission's avoided cost methodology for demand-side management programs, under subcontract to Energy and Environmental Economics (E3). This valuation was defined as future cost values (albeit uncertain), which are a foundation of orthodox utility financial planning, rather than as externalities, which had been previously estimated but carried little legal weight. The method was adopted in April 2005 for all long-term utility resource planning and procurement decisions.

• Performing a supply risk analysis for the Nebraska Public Power District cooperative, comparing the reliability and economic impacts of extreme risk scenarios on supply portfolios augmented by coal, nuclear, natural gas, and renewable resources. Several scenarios included carbon dioxide emissions limits and costs. The analysis involved modeling the price interactions between electric, natural gas, coal, and emissions markets under each scenario, as well as identification of strategies to mitigate risks related to carbon dioxide emissions and other impacts of each resource.

• For a leading information technology firm, identifying and evaluating a range of potential investments in clean energy technology and other GHG mitigation measures. Based on the evaluation results, we are prioritizing these measures to assemble a robust portfolio of carbon offsets to balance corporate emissions to meet the firm's economic, environmental, social and practical criteria.

• Helping San Diego Gas and Electric management realign its demand-side programs with the latest techniques for integrative design (which make savings larger but cheaper) and for making markets in saved electricity (so more market actors are rewarded for faster savings).

• Conducting a series of briefings for the investment bank Crédit Lyonnais S.A.'s clients in the financial services industry. The briefings—in Europe, Asia, and North America—are ongoing, and they cover corporate carbon management strategies, technical options for carbon dioxide emission reductions, and implications of present and future carbon constraints for shareholder value in a range of industries and firms.

• Our work with fossil fuel producers also offers opportunities to shift their strategies. For example, at least one large coal-mining firm we work with is starting to view its coal assets through the lens of the hydrogen value chain—potentially the highest and best use of coal in a carbon-constrained world.

Designing the Integration

MONSTER HURRICANES. GROWING OBESITY among Americans. High oil prices.

These sound like wholly unrelated issues, and for most people they are. But seemingly disparate challenges often have the strands of a common solution. A cutting-edge green business in, say, Florida might be housed in a facility that promotes a healthier working life while offering safe and secure shelter from storms—and be designed to use no fossil fuels, reducing both their cost and their propensity to cause "global weirding." Similarly, innovative lighting, cooling, and ventilation a kilometer beneath the South African veld can both boost the competitiveness of that nation's platinum exports (whose foreign currency earnings are vital to development) and improve the health of HIV-positive miners. The lessons we've learned in redesigning refugee camps as whole systems often transfer nicely to rebuilding after the Indian Ocean tsunami or Hurricane Katrina.

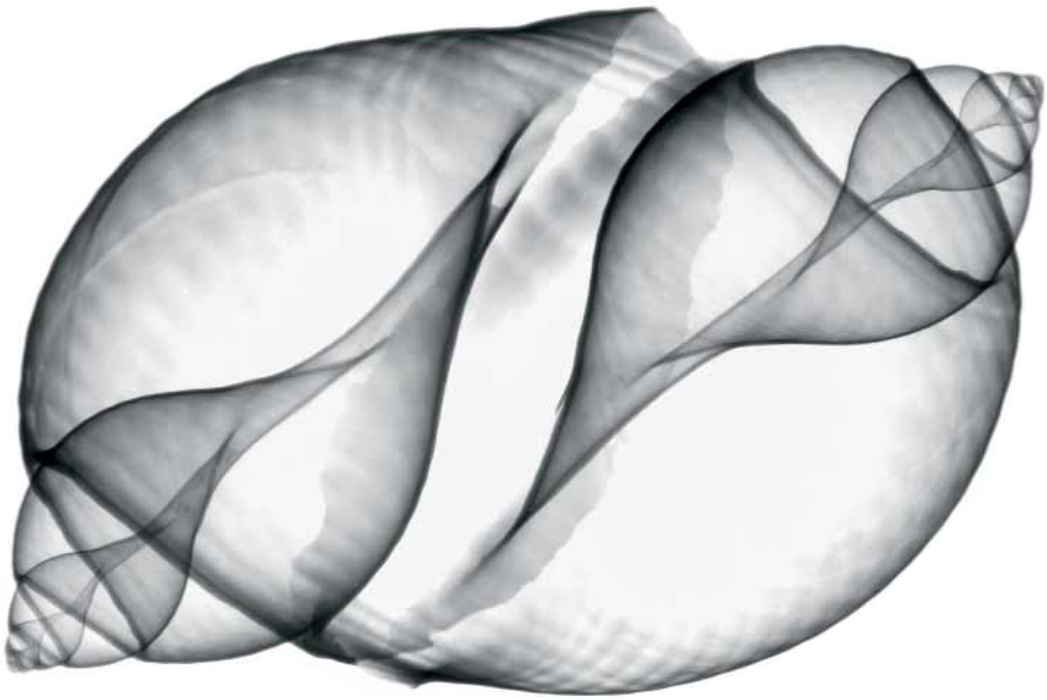
All of RMI's research and consulting creates and applies integrative design, but the RMI Integrative Design team tackles projects that don't fit neatly into the sectors of energy or green building. It's not just a shoebox into which problems that can't be classified into "energy" or "real estate" are tossed in the hope they'll self-assemble into a solution. Rather, across a very wide range of applications and industries, RMI's Integrative Design Team envisions across boundaries, casting a wide net to capture new ideas that solve many unique challenges at once.

To deliver the holism that its clients' unusual problems require, our Integrative Design Team draws on the knowledge and perspectives of the entire Institute plus hundreds of outside experts.

Such breadth is vital to serve some twenty-two business sectors—a range that would tax the in-house resources of even the largest consulting firms. The Team might tackle anything from the redevelopment of a community's economy to a study of the links between management culture and eliminating waste at industrial plants, from greening a supply chain to redesigning a multi-billion-dollar heavy industrial plant—and, as a key byproduct, rearranging its designers' mental furniture so they'll subsequently do whole-system design optimization on their own.

During 2004–2005, highlights of the Institute's Integrative Design Team's work included:

• Helping design a new microchip manufacturing plant ("fab") with Texas Instruments (TI). Fabs' cost, complexity, and delicacy make operators risk-averse and prone to "copy exactly" previous designs, repeat-



ing their persistent inefficiencies. But by setting high goals for saving capital and resources, TI officials forced a new level of creativity. With RMI's help, TI's fab designers were able to cut total capital cost by 30 percent, water use by 35 percent, and energy use by 20 percent. The new fab broke ground in November 2004 in Richardson, Tex., not in China, because it became cheaper to build in the United States. It's already the talk of the industry. In February 2005, leading semiconductor toolmaker Applied Materials sent RMI's CEO to keynote Shanghai's SEMICON conference to summarize these design innovations, intensify competition, and bring it back to Texas to improve the next TI fab—which is expected to save far more energy, yet cost even less to build.

• Working with two of the world's largest mining companies to bring new levels of energy, resource, and capital efficiency to precious-metals, coal, diamond, and other projects. RMI helped Anglo American identify opportunities to significantly improve energy intensity and operational effectiveness. For example, in Anglo Platinum alone, the annual savings could amount to thousands of gigawatt-hours and millions of tonnes of carbon dioxide credits by 2010. That potential, with associated operational and ergonomic improvements, is now being implemented with strong management support. At another Anglo project, the Mondi Richard's Bay pulp and paper mill, RMI's analysis showed how energy efficiency and better use of waste products could lower costs and improve environmental quality.

• Closely advising a large retailer on advanced efficiency opportunities in buildings and transportation, advising Unilever on the efficiency of its flagship Ben & Jerry's ice-cream plant in Holland, and helping a leading European shipyard to develop a radically more efficient and higher-performance design with important implications for the whole field of naval architecture.

• Building on our previous year's work by collaborating with Cuyahoga County, Entrepreneurs for Sustainability (our local cousin), and three foundations (Joyce, Cleveland, and George Gund) to explore ways to craft a Model for Regenerative Development of the Cuyahoga River Valley. This synthesis will bring attention, excitement, and investment to a gritty industrial area near downtown Cleveland that has been ignored for decades. In recent years, community leaders have become interested in integrating nature into the bleak brownfield site. RMI is combining such goals as restoring wetlands and native vegetation, daylighting tributaries, expanding foot and bike paths and pocket parks, applying green real-estate development principles, exploring renewable energy sources and systems, and devising wider solutions to stormwater pollution and the stagnant river channel.

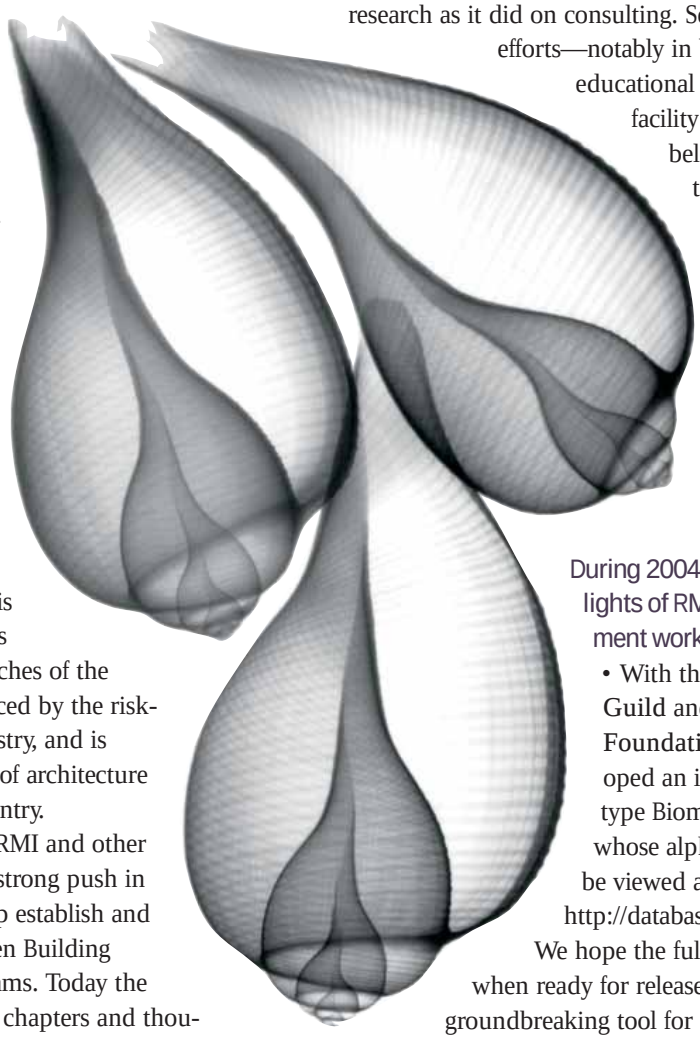
• Collaborating with the Society for Organizational Learning on its ongoing Materials Pooling Project. Some manufacturers pool their purchasing power to bring nontoxic, recyclable, or otherwise preferable materials to market. This requires sharing information, articulating definitions of such fuzzy concepts as "toxins" and "waste," and nurturing new intercompany relationships. This project, which has a major educational component, includes some of the world's best-known companies, and it is expected to lead to fruitful new relationships.

• Supported by the Concordia Foundation and in association with the Sustainability Institute, building a nearly-complete System Dynamics modeling tool for exploring how electric utilities' and societies' choices affect carbon emissions. The tool charts and mathematically models linkages, then simulates complex system behaviors through a user-friendly "management flight simulator." You can plug in carbon dioxide restrictions and various mixes of energy sources and savings, then see how prices, availability, reliability, and other parameters will unfold for the next year or the next twenty. This should greatly help utilities (pp. 6–7) to plan and implement their energy-related investments to optimize both carbon and financial performance.

RMI/ENSAR Built Environment Team*

Build it Green and They Will Come (Around)

NEARLY EVERYONE IN TODAY'S BUILDING industry has heard of green building, and observers say the market for sustainable built environments is sweeping the nation. A 2004 survey by Turner Construction Company, one of the nation's biggest general builders, found that 93 percent of real estate and construction executives expect their green workload to rise in the next three years. Another 2004 survey of architects and other building professionals conducted by *Environmental Design+Construction* found that 87 percent of respondents reported an increase in green building requests in the past two years and that 74 percent of firms surveyed currently have a designated expert on staff for environmental design and specifications. Green building is so commonplace it has been adopted by branches of the government, is embraced by the risk-averse real estate industry, and is now taught at dozens of architecture schools across the country.



That's no surprise. RMI and other organizations made a strong push in the early 1990s to help establish and promote the U.S. Green Building Council and its programs. Today the USGBC has dozens of chapters and thousands of organizational members—as well as a globe-circling sister organization, the World Green Building Council. Leadership in Energy and Environmental Design (LEED) buildings, a global standard RMI helped to create and refine, are now popping up all over China and India, nearly all in the Platinum and Gold categories, with support from the highest levels of government.

During the past year, as for the past 23 years, RMI continued to help developers and builders understand the benefits of green building design and refine their projects to use less energy and fewer resources. In recent years, however, the Institute has embarked on a journey to assess and quantify the effects of green building within selected sectors. Our 2004–2005 work focused as much on cutting-edge research as it did on consulting. Several of our efforts—notably in biomimicry and educational and healthcare facility design (see below)—are expected to influence benign and humane design in the new millennium much as green building changed development and construction in the 1990s.

During 2004–2005, three highlights of RMI's green development work stood out:

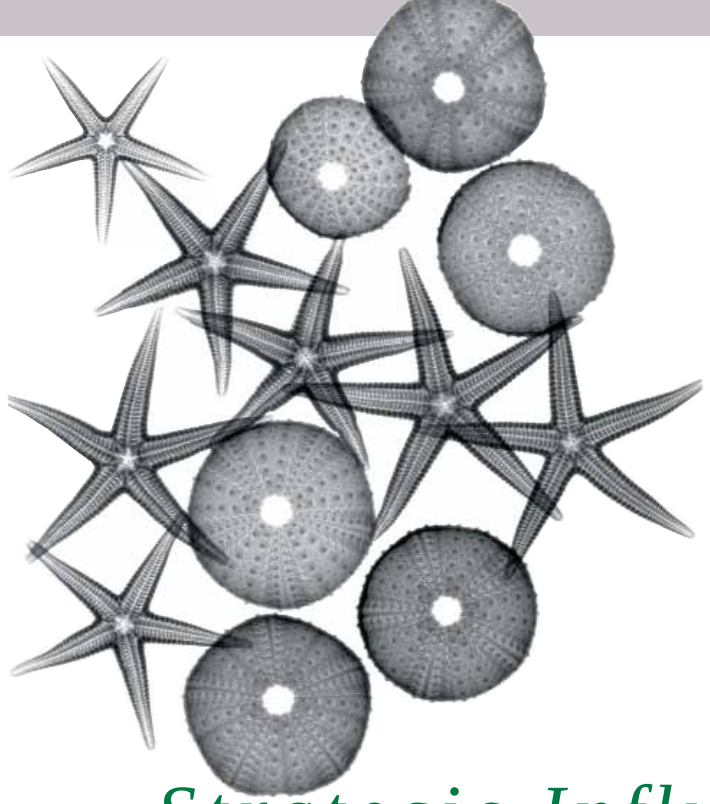
• With the Biomimicry Guild and the Argosy Foundation, RMI developed an interactive prototype Biomimicry Database, whose alpha prototype can be viewed at http://database.biomimicro.org. We hope the full-scale version, when ready for release, will become a groundbreaking tool for design, industry, and life science. More than a mere collection of information, this tool cross-pollinates knowledge across disciplinary boundaries, using natural models to inspire the design of green buildings and products. It reorganizes biological literature around functions, not organisms, so you can find the organisms that have solved your design problem, technical lit-

* The new name of RMI's former Green Development Services from 1 August 2005, a month after close of the fiscal year reported here (see p. 3).

erature on how they do it, researchers seeking to imitate those solutions, case-studies, and success stories. The full-scale, moderated, open-source Database will also be a place where diverse and dispersed design professionals and researchers can collaborate on practical biomimetic solutions.

• In association with Health Care Without Harm, RMI organized and facilitated a major workshop, "Design for Health: Summit for Massachusetts Healthcare Decision Makers," that brought together leaders and designers seeking to apply sustainable design principles in new Massachusetts healthcare facilities. The symposium heard evidence supporting "healthy design," and explored how to make hospitals healthier for patients, staff, the environment and community, and financial stability. Favorable outcomes include lower capital and operating costs, better clinical outcomes for patients, reduced risk and potential liability, anticipating regulatory requirements, stronger market performance, enhanced staff satisfaction, recruiting, and retention, better community relationships, demonstration of corporate responsibility and environmental leadership, and lower environmental impact. More direct outcomes from the Summit include wider understanding of and greater implementation of green design in healthcare facilities, both in Massachusetts and elsewhere. At least four hospitals that participated in the Summit have decided to apply the *Green Guide for Health Care*, promoted at the Summit, to upcoming construction projects.

• With staff and administrators of the Boston Museum of Science, RMI ran a design charrette for a combined major retrofit and addition to the museum facility. This was an unusually timely and promising project. The Museum is housed in an aging structure, admissions have been sagging, and, like museums everywhere, the Museum of Science must face fundamental questions about how to transcend the Victorian-era museum model of static displays behind glass. The workshop yielded a portfolio of advanced design recommendations that could influence museum design far beyond Boston, and could help designers to use museums' green design itself as pedagogy. The team recommended ways to make the Museum "ecologically neutral," using no net energy or water and producing zero net waste; emphasize transparency and daylight; and use renewable energy technologies integrated into the building's architecture. This was just one of RMI's many green design projects during the year, but because it draws many visitors, we think it shows promise of making a real splash.



Strategic Influence

The late great systems thinker Donella Meadows said[1] that the least effective way to intervene in a complex system is changing the numbers (taxes, subsidies, standards); then changing the material stocks and flows; then regulating negative feedback loops; then driving positive feedback loops; then changing information flows; then changing the rules of the system (rewards, penalties, constraints); then changing the patterns of self-organization; then shifting the goals of the system. The most powerful intervention, she said, is to change the mindset of the people who make the rules. At RMI, we call this "strategic influence," and we do a lot of it.

About two-thirds of the Institute's staff is involved in all manner of publishing, from reports and client-targeted advice to books, magazine, and newspaper content, to in-house pieces (including this one and our thrice-a-year *RMI Solutions* newsletter). Our op-eds, commentaries and analyses are seen worldwide. We maintain a website with thousands of pages of content, hosting 630,000 visitors in the past year. Each week, staffers field more than 100 email and 25 phone inquiries from the general public, many media inquiries, and several visitors, and offer tours of RMI's superefficient headquarters building (to an estimated total of more than 70,000 visitors so far). But even more effective than all these "wholesale" and "retail" activities may be our thought leaders' one-on-one and small-group private interactions with the world's movers and shakers.

What sorts of folks do we influence? Heads of state, leaders of some of the world's largest companies, top journalists, senior civilian and uniformed military leadership. A sampling from our CEO's speaking venues for the past fiscal year includes *Fortune*'s Aspen Brainstorm, TED Conference, FiRE Conference, Cosmos Club, U.S. Department of State, Aspen and Montreux Energy Fora, Brookings Institution, Pacific Council, Council on Foreign Relations, Baker Institute, Maguire Energy Institute, Houston Forum, Highlands Group, numerous senior Pentagon briefs, Naval Postgraduate School, International Energy Agency, Tokyo University, Japanese Diet, Hong Kong University of Science and Technology, Engineering and Construction Contracting Association, and Merrill Lynch's network of 200+ automotive financial analysts. Now mix in senior meetings with a half-dozen each of major automakers and oil companies, noted financiers, White House officials, Senators and senior Capitol Hill staffers of both parties, governors and policymakers from many states, cities, and countries. Add new publications in such places as *Time*, *Newsweek*, *Scientific American*, and *Encyclopedia of Energy*. Season with interviews and stories ranging from *Reader's Digest* to *Rolling Stone* and from *The Economist* to the German magazine *Focus*. Stir well. And now remember that RMI has not one person but 40–50, many with deep expertise, strong reputations, extensive networks, and diverse venues. Just on *Winning the Oil Endgame*, for example, their talks included Pentagon engineering conferences, a dozen days of three-continent financial-community events for CLSA (the research arm of Crédit Lyonnais), Harvard and Stanford Business Schools, World Presidents' Organization, CALSTART, AltTrans, and more. That's why, as a thought leader and influencer, the Institute can punch above its weight.

Much of RMI's credibility, especially in the private sector, comes from its business results. An academic think-tank's work would appear in *Energy Policy*, *Science*, *Nature*, and *Annual Reviews* but probably not *Harvard Business Review* and *Fortune* (we do all the above). It's because our work yields solid profits from new solutions to old problems that business leaders, and the civil society with which they coevolve, take note.

Saint Francis of Assisi is credited with saying: "Preach the Gospel continually. If necessary, use words." Rocky Mountain Institute communicates its solutions in many ways, but it's the practical manifestations of and the business buzz from our fieldwork, more than any eloquence of our words, that most changes the mindset of the people who make the rules.

[1] "Places to Intervene in a System," *Whole Earth*, Winter 1997, www.wholeeearth.mag.com/ArticleBin/109.html.

Solutions, National and Beyond

RMI's National Solutions Council has its own mission within the context of RMI: supporting the ideas and research developed at the Institute, and sharing them with like-minded individuals in their communities and around the world. As part of the NSC's mission, and its commitment to be part of the solution, each year members sponsor a specific RMI project. The RMIQ lecture series (RMI's Quest for Solutions, whose attendance has grown from 30 to 400 people) was selected for 2004–2005.

The Council and several other sponsors co-presented four RMIQs. In August 2004, Amory Lovins gave the audience a preview of *Winning the Oil Endgame* a month before its release; in February 2004, nationally renowned biomimicry expert Dayna Baumeister presented a new way to look at the building industry; in March 2005, RMI Senior Fellow Dr. Eric Rasmussen (a serving Commander in the U.S. Navy Medical Service and instructor in humanitarian medicine for the United Nations) lectured on tsunami relief; and in April 2005, RMI Trustee Dr. David W. Orr, professor and chair of Environmental Studies at Oberlin College, gave an Earth Day talk on environmental education. NSC member Charles Cuniffe, FAIA, has been especially involved in the lectures, independently cosponsoring two RMIQs through his firm, Charles Cuniffe Architects.

A unique feature of the RMIQ lecture series has been the wine-and-cheese receptions following the presentations, where the public can engage the speakers and RMI staff in in-depth discussions. Feedback has been overwhelmingly positive.

NSC salons have become another highlight of the Council's activities. Members gather together to learn about RMI over a glass of wine and a bite to eat, often in the lovely homes of NSC members. In July 2004, before the release of *Winning the Oil Endgame*, NSC Co-Chair Doug Weiser and his wife Linda hosted an important salon at their Snowmass home, where Amory discussed his team's findings and RMI's corporate work.

Council members also act as ambassadors by introducing Amory and RMI staff to members of their own communities. In December 2004, NSC members Bud Konheim and Nicole Miller introduced *WTOE* to their friends in New York City; in November 2004, NSC member Margie Haley brought Amory to Texas to speak at the Sustainable Dallas Conference. As part of this conference, NSC member David Henry arranged for Amory to speak to the Chancellor's cabinet for the influential Dallas Community College District, which is gearing up to build new green facilities.

In February 2005, NSC member Mac McQuown arranged for Amory to give a special presentation on natural capitalism at the Scripps Institute of Oceanography, in La Jolla, California, then hosted a reception. Finally, in April 2005, NSC members participated in a "Blue Sky" session with RMI's Board of Trustees and staff, where Richard Kidd of the U.S. Department of State spoke on Southeast Asian de-mining efforts.

The NSC has grown to more than 70 members, and continues to make a big difference in explaining RMI's work. We thank Council members, Council Co-Chairs Doug Weiser and Elaine LeBuhn and Honorary Chair Kathy Farver, for their continued efforts, and we welcome prospective new members.

Criteria for NSC membership

- Interest and willingness to support and promote the mission of RMI
- An annual contribution totaling at least $1,500 (individual or couple)

To learn more about the NSC, contact:

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Behind the Numbers

OFTENTIMES IT'S WHAT'S behind the numbers that drives an organization and gives it direction. At RMI, changes in our financial management over the past year were made for the express purpose of improving future operations. Sales and purchases of specific assets can be inferred by changes in the balance sheet and income statement, and receipts or expenditures of large gifts have impacts on the Institute's profitability. Yet some of the most critical changes are difficult to discern when reviewing our financial statements.

In February 2004 we began managing our internal operations on a grants-expended basis (see sidebar). This change in management philosophy has led to better accountability for all project managers at the Institute, though it may occasionally affect our bottom line—favorably or adversely. Grant-revenue receipts can fluctuate dramatically from year to year, but internal performance needs to be gauged by staff time allocated to specific project funds.

We recently established a "Grants Escrow Fund," separately invested from our operating account. This fund, together with grants receivable, reflects our commitment to protect gifts from donors and foundations for future work or pending projects. As new grants are received, they are invested in the Grants Escrow Fund and are released to RMI's operating account only as work is completed on grant-funded projects. To establish the Grants Escrow Fund, we sold an underperforming asset, an Old Snowmass staff housing property affectionately known as the "Cliffhouse." Because of the booming local real estate market, we received a $591,841 gain from the sale.

This year, the Investment Subcommittee of our Board of Trustees reviewed the performance of our Capital Reserve Fund, a quasi-endowment funded by the sale of our E SOURCE spinoff in 1999. During the past three years, annual investment returns have exceeded ten percent—on par with the best in the industry. Because of this excellent performance, we have chosen to continue our relationship with Ryan Investment Management, which manages the Capital Reserve Fund. The Investment Subcommittee is now evaluating other assets to ensure peak performance.

Over the past several years we have also achieved stability in our expenses. To improve project management, we decided that a new information system was necessary. Our current system is five years old and has significant shortcomings for project management. After extensive research, we selected Deltek Vision, an enterprise software system used largely by architects and engineers to manage projects. Deltek Vision includes project budgeting and accounting, resource scheduling, and personnel management capabilities. Combined with last year's purchase of the Raiser's Edge software system for RMI's Development team, we believe that we will have state-of-the-art tools to manage our operations.

Each of these improvements will be valuable as we hire, train, and support Research & Consulting staff during the next three years. Our Boulder operations have grown significantly over the past year, and we are also adding to our Snowmass capabilities. We expect that enhancements for financial reporting, internal management controls, and accountability will help the Institute achieve great things in the years to come.

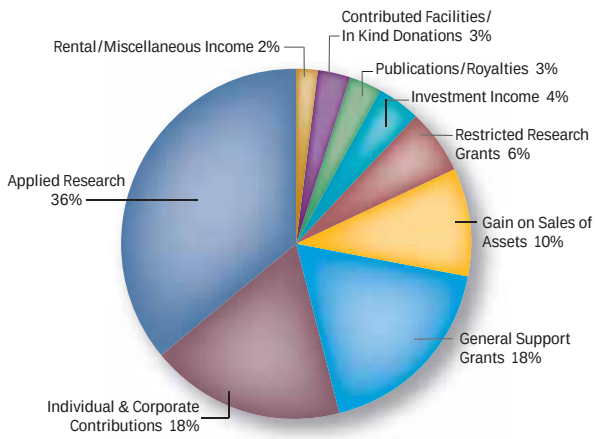
STEVE SWANSON

BALANCE SHEET – AUDITED

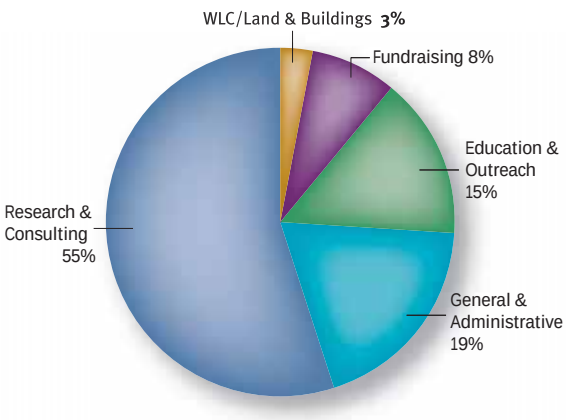
thousands of current dollars

ASSETS	6/30/05	6/30/04	6/30/03
Cash and Marketable Securities	$ 141	$ 244	$ 310
Investments	4,565	5,290	5,926
Grants Escrow Fund	653	-	-
Accounts Receivable	419	403	397
Grants & Pledges Receivable	608	770	166
Notes Receivable	311	-	-
Inventory	79	66	79
Property & Equipment (Net)	1,620	2,195	1,717
Assets Restricted for Endowment	696	691	687
Other Assets	74	73	62
TOTAL ASSETS	$ 9,166	$ 9,732	$ 9,344
LIABILITIES & NET ASSETS			
Current Liabilities			
Accounts Payable	$ 212	$ 156	$ 125
Compensated Absences	109	118	142
Other Accrued Expenses	341	277	535
Line of Credit	500	575	191
Total Current Liabilities	$ 1,162	$ 1,126	$ 993
Long-Term Liabilities	$ 1,388	$ 1,491	$ 1,596
TOTAL LIABILITIES	$ 2,550	$ 2,617	$ 2,589
NET ASSETS	$ 6,616	$ 7,115	$ 6,755
TOTAL LIABILITIES & NET ASSETS	$ 9,166	$ 9,732	$ 9,344

Revenues by Category



Expense by Activity



STATEMENT OF ACTIVITIES—AUDITED

thousands of current dollars	Twelve Months Ending 6/30/05	% OPERATING REVENUE	Twelve Months Ending 6/30/04	% OPERATING REVENUE	Twelve Months Ending 6/30/03	% OPERATING REVENUE
OPERATING REVENUES & SUPPORT						
Applied Research/Consulting	$ 2,195	42.4%	$ 2,407	40.4%	$ 2,615	46.3%
Foundation & Government Grants	1,445	27.9%	2,288	38.4%	1,617	28.7%
Individual & Corporate Contributions	1,100	21.3%	870	14.6%	931	16.5%
Publishing & Royalty Revenue	159	3.1%	57	1.0%	114	2.0%
Contributed Facilities/In-Kind Donations	157	3.0%	255	4.3%	308	5.5%
Other Revenue	118	2.3%	82	1.4%	58	1.0%
TOTAL OPERATING REVENUES & SUPPORT	$5,174	100.0%	$ 5,959	100.0%	$ 5,643	100.0%
OPERATING EXPENSES						
Salaries & Wages	$2,628	50.8%	$2,484	41.7%	$2,378	42.1%
Benefits	529	10.2%	553	9.3%	603	10.7%
Contract Labor	929	18.0%	942	15.8%	882	15.6%
Other Operating Expenses	1,622	31.3%	1,651	27.7%	1,621	28.7%
TOTAL OPERATING EXPENSES	$5,708	110.3%	$5,630	94.5%	$5,484	97.2%
OPERATING MARGIN	$ (534)	-10.3%	$ 329	5.5%	$ 159	2.8%
NON-OPERATING REVENUES						
Gain on Sale of Assets	$ 592	11.4%	$ -	0.0%	$ -	0.0%
Investment Income	265	5.1%	479	8.0%	(151)	-2.7%
Total Non-Operating Income	857	16.6%	479	8.0%	(151)	-2.7%
NON-OPERATING EXPENSES						0.0%
Depreciation Expense	130	2.5%	130	2.2%	121	2.1%
Facilities Contributed Expense	135	2.6%	154	2.6%	200	3.5%
Program-Related Investments	-	0.0%	50	0.8%	-	0.0%
Interest Expense	118	2.3%	114	1.9%	114	2.0%
Current Year Loss on Equity Investment (a)	439	8.5%	-	0.0%		0.0%
Total Non-Operating Expense	822	15.9%	448	7.5%	435	7.7%
CHANGE IN NET ASSETS	$ (499)	-9.6%	$ 360	6.0%	$ (427)	-7.6%

(a) In November 2004 RMI made a loan to Hypercar, Inc. (dba Fiberforge) of $750,000. Hypercar was a spin-off of RMI in 1998, and RMI still owns over 20% of its common stock. The loan was to support the purchase of equipment to fabricate custom carbon fiber products. Accounting Principles Board Opinion No.18 requires that we offset this investment against losses generated by Hypercar. Accordingly, $439,200 was written off in FY2005.

The Impact of Grants-Expended Management Accounting

Rocky Mountain Institute works on many restricted-grant projects, and at the same time provides consulting services to corporate and government entities. Generally accepted accounting principles ("GAAP") require that all grant revenue be booked on notification by the grantor, even if the grant is a multi-year award. Client service revenues, on the other hand, are required to be booked upon completion of services. This difference can distort management reporting.

Managing internal activities requires a consistent accounting method that reflects the work effort involved to complete projects. In order to track productivity and expenditure of grant funds, RMI has adopted the *grants-expended* approach to internal project accounting. All projects, including restricted grant projects and client consulting projects, are charged revenue and related time and materials as projects are completed. This method results in better management and oversight of all grant awards, but differs in timing from the GAAP presentation in our audited accounts.

In FY2005, we received new restricted grants of $536,636; yet staff completed restricted grant projects valued at more than double that amount (including multi-year grants that were reported according to GAAP in previous years). Here's how the presentation methods reconcile:

FY2005 (1 July 2004–30 June 2005)	GAAP Basis	Grants-Expended Basis
Restricted Grant/Contribution Revenue	$ 536,636	-0-
Restricted Grants/Contributions Expended	-0-	$ 1,235,710
Operating Margin (Before NonOperating Items)	$ (376,500)	$ 322,574
Net Income	$ (60,773)	$ 637,144

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Gifts received from 1 July 2004 through 30 June 2005

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About the artist:

The remarkable art used throughout this publication was produced by the Dutch-born photographer Albert Koetsier, who has spent a lifetime combining his passion for photography with a career in the fields of optics and X-rays. Albert's wonderful images are a perfect visual complement to the notion that nature's designs are elegant and simple, and always create abundance. For more information, please visit www.beyondlight.com.

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