

Deepening Our Impact

Recently, RMI changed its structure in order to be better prepared to capture several major opportunities.

You've heard us talk about these opportunities before. Buildings, utilities, and vehicles have

been three of the big ones (and RMI's structure reflected those programmatic areas), but in the past year we've focused more closely on particular targets. Deepening our impact in certain

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Winning the Oil Endgame Update

In mid-2005, Rocky Mountain Institute launched a three-year, \$4-million effort to make this 2004 Pentagon-cosponsored RMI study's implementation irreversible via "institutional acupuncture"—inserting needles wherever the business logic is congested and not flowing properly. The first two years' results have exceeded expectations. We must transform six sectors, at least three of which seem to have passed the "tipping point":

- **Aviation.** Boeing's fuel-frugal, half-carbon-fiber 787 Dreamliner has had the fastest order take-off of any airplane in history and is sold out into 2014. This competitive leapfrog beat Airbus, moved Boeing from trouble to triumph in just two years, and is accelerating. We're helping to speed it further.

- **Heavy trucks.** Based on our analysis, Wal-Mart committed to double its fleet efficiency by 2015, which would save it billions of dollars. The first step in Wal-Mart's fleet transformation—a 25 percent fuel saving in trucks bought starting January 2007—was successfully implemented.

This "demand pull" will let everyone else buy those trucks too, saving 6 percent of U.S. oil. Next we'll help broaden the buyers' consortium, speed suppliers' innovations, and demonstrate tripled-efficiency designs.

- **Military.** The Pentagon is finally emerging as the leader within the federal government in getting our nation off oil so nobody need fight over oil. An autumn 2007 Defense Science Board report is expected to support our case for making radical military energy efficiency a strategic goal—thus making warfighting more effective but less necessary, and triggering military R&D that would transform civilian vehicles' efficiency just as it created the Internet, GPS, and the jet and microchip industries.

Automaking is the hardest and slowest sector to change, but after 17 years' effort, important shifts are suddenly accelerating. The expected tsunami of "creative destruction" now washing over the industry is changing top managers or their minds, whichever comes first. Two of the

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what's inside

4 Thought for Fuel

Lena Hansen of RMI's Energy & Resources Team describes RMI's work with NREL on a redesign of the biochemical cellulosic ethanol conversion process.

4 RMI LEEDing in Wyoming

A project RMI helped guide was recently awarded LEED NC v2.1 Platinum, thus becoming the first LEED-certified project in Wyoming and 52nd project to be certified as Platinum.

5 ABL Wins Big

RMI's Amory Lovins has won both the Blue Planet and the Volvo Environment Prizes becoming the first person to receive both awards in the same year.

6 Not Just Any Port in a Storm

RMI's Stephanie Johns describes our recent efforts to help the Ports of Seattle and Tacoma green up their fossil-fuel-intensive operations.

Built Environment Team

Making the Case

With its brilliant lights visible for miles and water features of every imaginable size and shape, the Las Vegas Strip is definitely not a poster child for sustainability. But where some see extravagance and waste, RMI's Built Environment

Team (BET) sees opportunity.

Recently, the group signed a consulting agreement with MGM/Mirage to assess its environmental footprint. By analyzing the company's 68-acre City Center project and the rest of its building stock, the Built Environment Team is helping the casino conglomerate establish benchmarks for energy and water use that will serve as metrics for future projects.

Consulting with MGM/Mirage is just one example of how the Built Environment Team is working with high-profile clients to make the case for green building.

As the demand for their expertise grows, the Team has been able to select clients who want to set a radical new standard in energy-efficient buildings. These

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Deepening Our Impact

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areas while keeping our work broadly applicable is the goal with the reorganization of our Breakthrough Design Team (BDT). Formerly, BDT worked on everything from "greening" a chip fab to designing a new type of fleet vehicle to devising ways for cities to implement and sustain "green" programs and initiatives.

Now that we understand the commercial, environmental, and popular potential of a plug-in hybrid electric vehicle, we've assigned several of our automotive engineers to concentrate on that effort alone (see story at left). And because vehicles represent such an energy and environmental challenge, we've established another team, MOVE (see p. 3), to tackle other transportation-efficiency questions currently not addressed by most other groups. We are also strengthening and integrating the innovation process that's at the core of every Team's work.

Thus our research and consulting practice areas are now the Energy & Resources Team, the Built Environment Team, the MOVE Team, and the Plug-In Hybrid Electric Vehicle Team. They are pushing forward with the kind of leading-edge work RMI's undertaken

for decades, and are now more sharply focused on specific challenges whose solution will make the world better and safer.

RMI has always had unusual power to convene the right players, the technical know-how to realize smart design, the ability to scrutinize the entire system, a savvy business approach, and the desire to drive transformation. Today, with our new structure, we believe we'll be able to deepen our impact more than ever.



Plug-in Hybrid Electric Vehicle (PHEV) Team

Electrifying Plans

Picture cars running on wind, solar, and hydroelectric energy, uncompromised, with long range, with better safety, and at a profit.

Sound a little far-fetched?

Members of RMI's new Plug-in Hybrid Electric Vehicle Team don't think so. In fact, the researchers on RMI's PHEV Team are so convinced renewable electricity can be used to power vehicles, they're strategizing how to make such vehicles—fifty thousand of them a year!—competitively by 2012.

Working as part of a Consortium of automotive equipment and high-tech firms (Alcoa, Johnson Controls, and Google), as well as a foundation (the Turner Foundation), the Team is using clean-sheet design integration to optimize all the synergies embodied in GM's EV1 and RMI's Hypercar®—ultralight construction, low-drag design, hybrid-electric drive, software-rich architecture, and efficient accessories. The Consortium's automotive engineers are currently designing the most energy-efficient drivetrain, wheels, suspension, interiors, tires, and other components imaginable, and showing how, artfully combined, they can all make sense and make money.

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Winning the Oil Endgame

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Big Three U.S. automakers' CEOs now come from outside the industry, and one had led Boeing Commercial Airplanes' recent efficient-airplane leapfrog (matching our suggestion that Detroit emulate Boeing's competitive strategy). Both of our MOVE Team's transformational car projects—one at an automaker level, another with a consortium of Tier One suppliers—turned up trumps, more are starting, and integrative ultralight design is emerging as the industry's new wave. A major automaker's new emphasis on lightweighting is likely to inspire followers. Dealers and the UAW consider breakthrough innovation vital to the industry's survival. Reinforcing these trends, RMI's June 2007 private Feebate Forum roused strong industry and stakeholder interest and an agenda of follow-on research and experimentation. And important 2007 contextual innovations range from RMI's "smart garage" to our partner Sturman Industries' "digital engine."

The fuels and finance sectors are progressing, too. From cellulosic ethanol to butanol to algal oils, a portfolio of exciting new biofuel options, many still in stealth mode, is moving from lab to market. (RMI's work in hypothetical designs for cellulosic ethanol plants would save a typical new unit half its steam, three-fifths of its electricity, and a third of its capital cost.) In 2006, the global financial sector invested \$71 billion in new "clean energy" projects.

Extensive *WTOE* outreach continues, including a late-2007 Chinese edition. RMI is seeking funds to continue all these implementation efforts through 30 June 2008, then will evaluate.

—Amory B. Lovins

RMI MOVE Team

Over a Barrel

RMI MOVE is the name of a new RMI Research & Consulting team established to work on all things pertaining to transportation. MOVETeam Leader Michael Brylawski thinks buildings and electricity generation get too much credit for being the monsters of global warming.

"Everyone wants to claim the most carbon, but if you look at carbon contributions, it's pretty even between electricity generation, transportation, and buildings," he says. "All modes of transport add up to a third of the United States' carbon emissions. Transportation accounts for 70 percent of U.S. oil use."

The Team's objectives are strongly aligned with RMI's Winning the Oil Endgame efforts (see p. 1). The Team is involved with several large-scale, transformative projects in the car, truck, plane, and cargo arenas.

The MOVE team is spearheading the market, business, and lifecycle analysis for RMI's PHEV car project—which itself ramped up so quickly that it is now an important

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Energy & Resources Team

Powerful Ideas

RMI's Energy & Resources Team is working to change the energy paradigm from waste to efficiency, risky fossil and nuclear fuels to benign renewables, gigantic to right-sized, brittle to resilient, and costly to affordable.

"For a utility, efficiency and renewable sources aren't just fringe items that save a little fossil fuel and get you some good PR," said current Energy & Resources Team Leader Dr. Joel Swisher, PE. "They should be at the heart of the game."

RMI's energy clients are mainly electric utilities and large power users, like industries and commercial firms. ERT provides these clients with a unique mix of deep technical knowledge and holistic, strategic perspective to create end-to-end strategies that are radically more efficient, reliable, and competitive.

Changing the energy paradigm, though, means digging into the details as well. Recent ERT projects have assessed the cost-effectiveness of energy efficiency programs, analyzed demand-response programs (shifting energy use from peak periods to non-peak periods), and identified the regulatory

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Making Cellulosic Ethanol a Reality

RMI and NREL Redesign the Conversion Process

BY LENA M. HANSEN

Cellulosic ethanol has the potential to revolutionize the fuels industry. RMI and many other experts have been saying this for a few years now.

Cellulosic ethanol—made out of woody and grassy crops like switchgrass and poplar rather than corn—doesn't compete with food crops for land and reduces greenhouse-gas emissions roughly 60 percent more than corn ethanol. In RMI's 2004 book *Winning the Oil Endgame*, we estimated that cellulosic ethanol could displace 3.7 million barrels of oil per day for less than \$26 per barrel. Significantly more should be cost-effective given today's high oil prices. So why hasn't the cellulosic ethanol revolution occurred? Chief among the reasons is the simple fact that cellulosic

ethanol is currently too expensive. While great strides have been made in research and development and several pilot plants are operational, conversion of cellulose to ethanol is currently not cost-competitive on a commercial scale.

Earlier this year, RMI decided to address this problem in earnest. The question for us became: what aspect of ethanol production is the best place to foment the revolution? Growing the crop, converting the crop into ethanol, and distributing the finished fuel to filling stations are factors that all contribute to the cost of cellulosic ethanol. However, RMI believes that one of the best leverage points for reducing cost is the conversion process because of its concentration of expensive and energy-intensive processes.

What better partner could we

choose for this effort than the National Renewable Energy Laboratory (NREL), an organization that is leading research into cellulosic ethanol conversion? Together, RMI and NREL believe that applying RMI's whole-system design principles to the cellulosic ethanol conversion process has the potential to significantly reduce both the energy consumed by the conversion process as well as the final production costs.

While there are many types of processes that can be used to convert cellulose into ethanol, NREL operates a pilot plant in Golden, Colorado that uses enzymes to break the cellulose down into a substance that can then be fermented into ethanol in a way that is similar to the typical corn fermentation process. This process is the closest to commercialization, and therefore a small interven-

RMI Honored by AIA for Distinguished Contributions to Architecture



Victor Olgyay, AIA

RMI recently received recognition from the American Institute of Architects for a green building work. Earlier this year, RMI was one of ten recipients of the 2007 Institute Honors for Collaborative

Achievement. The award, presented at the AIA National Convention in San Antonio, "recognizes and encourages distinguished achievements

of allied professionals, clients, organizations, architect teams, knowledge communities, and others who have had a beneficial influence on or advanced the architecture profession."

"This award is particularly meaningful as developing collaborative processes is an area where we expend much of our energy," said RMI's Victor Olgyay, AIA. "Collaboration is the path forward, and much more important than any single product specification or design detail. Coming from the AIA, this award has special significance as an award from our peers."

tion could make a big difference.

In June, RMI and NREL convened a design workshop to develop innovations applicable to the biochemical cellulosic ethanol conversion process. If viable, implementation of these ideas would significantly reduce the break-even ethanol sales price.

The workshop brought together experts from a wide variety of fields pertinent to biofuels production, including representatives from Dow Chemical, Novozymes, Cargill, and many others.

Workshop participants developed more than two-dozen distinct design improvement ideas, ranging from incremental improvements to long-term research and development objectives. A primary objective of the workshop was to look for opportunities to reduce the high capital cost of the “base case” plant design—and we succeeded.

In fact, we estimate that the combined impact of the innovations developed at the workshop could include:

- A potential 30 percent reduction in

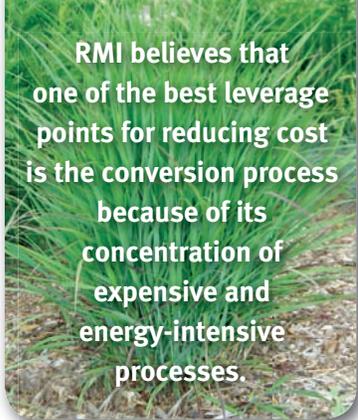
total plant investment through a \$30 million reduction in capital equipment;

- A potential 40 percent reduction in operating costs (approximately \$22 million per year) created primarily through reduced enzyme consumption and increased electricity export; and

- A potential 20 percent increase in ethanol yield from process improvements.

These results include a potential 60 percent reduction in electricity demand and a 50 percent reduction in steam demand. What kind of design innovations could result in such large energy and cost reductions? Here are a couple of examples:

Tunneling through the cost barrier—Lots of small improvements can eliminate the need for a large capital expenditure. For example, by using more efficient equipment and employing a more streamlined plant design,



RMI believes that one of the best leverage points for reducing cost is the conversion process because of its concentration of expensive and energy-intensive processes.

compressed air (which is very energy intensive) is no longer necessary—which means there’s no need to buy all the equipment required for making compressed air.

Advanced distillation—Thinking about the whole system can often bring forward synergies. Removing solids and water from the distillation step using a process called pervaporation can result in the elimination of one distillation column and a 50 percent reduction in the size of another.

These and many other ideas are being further analyzed and developed by NREL, and RMI will continue to work with NREL and industry experts on innovative plant design. Stay tuned. The revolution is on its way.

Lena Hansen is a Senior Consultant with RMI’s Energy & Resources Team.

RMI Wyoming Project Gets Platinum

An innovative RMI project in Wyoming was recently awarded LEED NC v2.1 Platinum by the U.S. Green Building Council, thus becoming the first LEED-certified project in Wyoming and 52nd project ever to be certified as Platinum.

RMI provided energy and daylighting analysis as well as comprehensive LEED coordination for the Laurance S. Rockefeller (LSR) Preserve, a 7,573-square-foot visitors’ center located in Grand Teton National Park.

RMI drove the high-performance building efforts alongside the architect and the design team during the early phases and extended that through the construction of the building by working closely with the contractor and providing education on the benefits and procedures of LEED.

“The building is a fantastic example of a truly integrated design process and how technical analysis applied early and often will produce high-performance results,” said Cara Carmichael, a Consultant with RMI’s Built Environment Team. “It

is a model for Wyoming and for the Park Service as a whole.”

The Preserve uses 76,000 gallons per year less water than a typical building of the same size and function through the use of composting toilets and low-flow fixtures. Recycled-content materials, including structural steel, cotton-batt insulation, metal roofing, and carpet help minimize the amount of embodied energy in the structure. And more than 75 percent of the construction waste was diverted from the landfill, including the waste associated with a massive relocation effort for 30 buildings on the site. Also, at least 20 percent of all materials and products used were manufactured within a 500-mile radius of the project site. A ground-source heat pump, a 10-kilowatt photovoltaic system, Heat Mirror windows, a 0.8-watt-per-square-foot lighting power density, and occupant lighting controls all contribute to an 84 percent reduction in regulated building energy costs.



Greening the Ports

By STEPHANIE L. JOHNS

So what does it take to transport a pallet of goods from an overseas manufacturing plant to your neighborhood store? Well, here's the short version: first the goods need to travel from the plant to a port and then be loaded into one of many dockside shipping containers. The containers are then stacked aboard a giant cargo ship. The long ocean journey to the destination port is next, followed by unloading via cranes onto the port terminal. There, it is handled by a variety of cargo-handling equipment and ultimately put on a truck or a train and hauled to your hometown. The process involves a vast network of companies, people, and equipment—most of which is unknown to the average consumer.

In a world that is becoming increasingly connected through global trade, major shipping ports play a vital, but often invisible, role in the world economy. These ports also play an essential role in the future of sustainability for our planet. Essentially all international cargo travels through multiple ports and is handled by a variety of equipment. Since the entire process uses energy and produces emissions, it offers a major opportunity to reduce the environmental impact of international shipping through whole-system

design and efficiency.

Earlier this year, RMI conducted a large Innovation Workshop with the Port of Seattle, the Port of Tacoma, and the Puget Sound Clean Air Agency (PSCAA). The idea was to take a fresh look at port operations, with the goal of developing solutions that reduce energy use and emissions in all aspects of operations—from ships arriving in port to the transport of goods via trucks and rail. Almost 70 participants attended the workshop, representing all facets of the shipping industry: the ports, unions, major shipping companies, electric utilities, the trucking industry, and various other areas. We began by examining port operations in sections, such as “goods arriving,” “goods in port,” and “goods leaving,” as well as overall business opportunities. Next we formed groups to focus on specific areas of implementation such as vessels, logistics, trucking, and port electrification. In addition, another group considered “blue-sky” ideas for a potential port of the future, or, as we dubbed it, “NuPort.”

The result? More than 40 ideas for solutions were generated, from electrifying yard hostlers to developing a “Logistics Guru” for coordinating information and even suggesting new business models for drayage trucks. Each major idea was

developed along with an action plan for implementation. It's worth noting that while some ideas are still being evaluated, others have already been adopted by the ports.

One example is port electrification. The majority of cargo-handling equipment in ports is powered by diesel fuel. All this equipment operates near a central base of operations at the port, making it ideal for electrification. Workshop participants made suggestions on how to best use electricity for all port equipment, and they focused in on one ubiquitous item—the port yard hostler. A port yard hostler is essentially a Class-8 off-road truck. It consists of a small cab and a fifth-wheel to which different chassis are attached in order to haul containers around a terminal. The group evaluated the benefits of an all-electric hostler and proposed a project to design one, thus completely eliminating the on-site emissions for an entire class of equipment. Also, since converting energy from electricity in a battery to mechanical power is more efficient than burning fossil fuels, the overall emissions—well to wheels—are also reduced. Indeed, port yard hostlers can potentially operate completely on renewable power from the grid.

Another major area for energy and resource efficiency improvements is logistics.

There is an obvious need for improving the flow and integration of information through the entire supply chain to facilitate the movement of goods through the port and over land via truck or rail. To improve the availability and flow of information, the group developed a “Logistics Guru” concept—a consolidated, comprehensive data-sharing system to better coordinate transportation information, thereby saving time and money, reducing idling time, and lowering emissions.

And how about NuPort, the port of the future? The group exploring this concept

considered what could happen given a clean slate when redesigning the shipping process. Group members examined multiple ways ships could be redesigned to improve the offloading of goods, ways the terminals and equipment could be designed so that there is a continuous flow of goods through the port (which means it is operating more efficiently), and using lighter materials for cranes (using lighter material reduces weight which reduces the amount of energy needed to move the cranes and eliminates the need for reinforcing the terminals as the ships and

cranes get bigger and bigger).

So where do we go from here? After such a successful Workshop, port officials have had a chance to evaluate the myriad ideas generated by the participants on their own merit, in addition to everything they were already doing to address their environmental impacts. And as they move toward a more sustainable, healthy future, RMI will be there to offer any additional help they might need.

Stephanie L. Johns is an Analyst with RMI's Research & Consulting group.

Are You Looking for a Great Way to Support Rocky Mountain Institute?

Your IRA May Hold the Key...

BY JIM KOZEL

More than 5,814 individuals have contributed \$102 million to charities through IRA rollovers since Congress passed the Pension Protection Act of 2006, according to figures released last month by the National Council on Planned Giving (NCPG).

Taking advantage of the provisions of the Pension Protection Act of 2006 may be a great way for you to support Rocky Mountain Institute. The law allows you to make a charitable transfer from your IRA directly to RMI without paying income tax on the withdrawal. Although the transfer does not generate a charitable deduction, it does count toward your 2007 required minimum distribution. Note: although there is no minimum, the maximum amount allowed for a charitable rollover is \$100,000.

To qualify for IRA rollover treatment:

- You must be at least 70.5 years of age;
- You must have your IRA manager transfer funds directly to Rocky Mountain Institute no later than December 31, 2007; and
- Your gift must be outright. Rollovers to a planned gift, such as a gift annuity or a chari-

table remainder trust, do not qualify. Neither do outright distributions to a charity from employer-sponsored retirement plans, such as SIMPLE IRAs, 401(k)s, and 403(b)s.

For the right individual, the IRA rollover presents a wonderful opportunity to make a tax-wise and generous gift, and it can be as simple as directing your IRA fund manager to make a direct transfer to RMI.

Please consult your financial advisor if you meet the qualifications for an IRA rollover and would like to take advantage of this wonderful giving opportunity. You may also contact Jim Kozel (at 303-567-8716 or by email at jimkozel@rmi.org)

with questions about making an IRA rollover gift to Rocky Mountain Institute.



Jim Kozel is a Senior Development Officer at RMI.

Note: IRA rollovers may be included in your income for state and local tax purposes and may not earn an offsetting charitable deduction, depending on state and local law.

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* RMI Legacy Society members who join by December 31, 2007 will be honored as founding members.
Contact Jim Kozel, Senior Development Officer 303-567-8716 or jimkozel@rmi.org

RMI Legacy Society

One of the simplest ways to become a member of the RMI Legacy Society is by creating a bequest or adding a codicil to your will or trust. Here is an example of bequest language that you may use. *Note: We always recommend discussing such gift decisions with your legal counsel.*

"I, _____ (your name), hereby give, devise, and bequeath (___% of my estate) or (___% of the remainder of my estate) or (the sum of \$ _____) or (the following property____) to Rocky Mountain Institute, a not-for-profit organization incorporated in the State of Colorado."

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solutions

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Letters to the Editor

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About RMI

RMI is an entrepreneurial nonprofit organization that fosters the efficient and restorative use of resources 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 show 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 70. 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.

Members of the National Solutions Council are:

- Invited to participate in various discussions with RMI staff and/or Board of Trustees about global issues.
- Special invitees to RMIQs (RMI's Quest for Solutions presentations) and other RMI events.
- Sponsors of regional RMIQ presentations or series.
- Recipients of advance notification of key upcoming RMI publications.

The NSC extends an invitation to all RMI donors of \$1,500+ annually to join. Watch your mailbox for upcoming NSC events!

For more information about the Council, please contact Development at 970-927-3851 or develop@rmi.org.



Earth Share.

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 at 970-927-3851.

Built Environment Team

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clients are demanding innovative and cutting-edge designs. By adopting the 2030 Challenge, the Team is working toward buildings that at least halve comparable designs' typical greenhouse-gas emissions.

"We're trying to be more selective and much more effective," explains BET principal Victor Olgay, AIA.

That goal has led the Team into a partnership with the Clinton Climate Initiative (CCI)—a long-term endeavor to encourage wholesale building retrofits in some of the world's largest cities. Following the AIDS-drug model developed by

CCI's parent, the William Jefferson Clinton Foundation, RMI is helping link vendors with buyers, creating a larger market for energy-efficient design and systems.

Even with these successes, Team members say they still encounter a good deal of public skepticism.

"People ask, 'How can you possibly do that?'" explains Olgay. "There's still a lot of inertia and superstition in the building industry."

To counter this thinking, the Team has been compiling case-studies for a series of short video productions, the first of which will be unveiled at this year's GreenBuild Conference in Chicago.

Team members hope that this

production will open people's eyes not just to the benefits of green building, but also to the vast possibilities these designs create. By employing better design practices, Olgay notes, buildings can do more than cut their resource use—they can actually give back more than they consume.

Need proof? Take the newly opened National Energy Laboratory of Hawai'i, for example. The Built Environment Team helped the project earn LEED Platinum status—making it one of the ten best green buildings in the world. Because of its efficient design, the building produces twice as much energy as it uses.

Case made.

PHEV Team

continued from page 2

Of course, renewables aren't big enough to power the U.S. automotive fleet, or even a sizeable portion of it—yet. But, PHEV Team Leader John Waters is quick to point out that carbon-based fuels will become a key bridging strategy. Having cars running off grid power will only increase (though modestly) the demand for electricity of all kinds, including renewable electricity.

"There have been more than seventy studies on this question," John notes. "Do we net a better carbon dioxide reduction by relying on the grid rather than relying on gasoline or diesel? Depending on how you evaluate it and which region of the

country you study, there's a 30–75 percent reduction in emissions by using coal-based electricity rather than liquid fossil fuels in cars and trucks.

And fifty thousand of these vehicles replacing today's models and driven for ten years, PHEV Team members have calculated, would reduce carbon dioxide emissions by 23 million tons.

Detroit is taking notice, too. RMI's PHEV Team has already consulted with one automaker about adopting some of these platform efficiency strategies in its products.

John Waters is glad he and his automotive engineers have been "spun out" from his former Breakthrough Design Team (BDT). BDT was working with multiple

industrial clients, and the opportunity to focus on this one transformative transportation solution with huge global benefits was too ripe to ignore.

The next phase may see strategic members and investors starting a company with the Consortium providing the intellectual capital that will drive design and manufacturing, along the lines of RMI's four previous for-profit spinoffs.

The challenge, then?

"Funding that enterprise so we launch it quickly and empower it for long-term success," John says, is the next step. "It needs the right amount of smart, upfront investment. But the world needs our solution yesterday."

RMI MOVE Team

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stand-alone project complete with its own team (see p. 2).

A second MOVE project—the "Transformational Vehicle"—is underway in conjunction with a major automaker, and shows much commercial promise in RMI's 17-year quest to design more

energy-efficient vehicles.

A third major effort is lightweighting the ubiquitous steel shipping container (a typical 20-foot container weighs 5,140 pounds empty!), while a fourth area of work will be defining sustainability solutions for large transportation firms.

Finally, the team is helping to redesign long-haul truck-trailers, which cause three-

fifths of a large truck's total aerodynamic drag and use two-thirds of its fuel.

If just half the United States' 2.6 million Class-8 trucks were given a "simple" package of fuel-saving devices (idle-reduction devices, efficient tires, and aerodynamic kits), their owners or operators could save 2.9 billion gallons of diesel a year. The fleet would emit 30 million metric tons less

RMI MOVE Team

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greenhouse gas per year—the equivalent of taking 170,000 trucks off the road.

“We want to tackle a high-impact area that no one else is addressing,” Michael said of the trailer redesign. “RMI’s core strength is to use our unique demand-side analytical approach to find breakthrough opportunities like the long-haul trailer, then bring diverse stakeholders together to create market-attractive solutions.”

Recently, a speaker at the RMI25 anniversary celebration mentioned that “saved lives” is one metric for his venture capital firm. “That could be a metric for us,” Michael says. “But we’re about saved barrels of oil. For us, it’s all over a barrel.”

Energy & Resources Team

continued from page 3

and financial risks of greenhouse-gas emissions.

In addition to burgeoning client work, ERT researches cutting-edge energy topics, like variable renewables and cellulosic ethanol. Wind, for example, is considered a non-“firm” or variable power supply, available only when the wind blows. However, RMI’s research has confirmed that many wind turbines spread across a large geographical area can offer a far steadier power supply than any single turbine. Likewise, cellulosic ethanol—made from woody and grassy plants or waste residues rather than an annual food crop like corn—is not yet cost-competitive, but ERT is uncovering ways to make it so.

“Energy needs to be thought of as a portfolio, as a package of resources—both supply and efficiency—that complement each other, rather than one

Office of the Chairman and Chief Scientist



In March 2007, Michael Potts became RMI’s new CEO and I moved up to the new position of Chairman and Chief Scientist, freed from day-to-day operational management for even more challenging tasks: mission evolution and adherence, thought leadership, strategic influence, special projects, and quality control. My new

office is reorganizing under an experienced Chief of Staff—Stanford physicist and Bain consultant Dr. Alex Markevich—to use my time most effectively. My office of six currently conducts four main special projects:

- Guiding *Winning the Oil Endgame* implementation, mostly via the MOVE Team because it emphasizes vehicle efficiency.
- For *WTOE*’s military component, helping complete the Defense Science Board report as an independent advisor to DoD and to embed its message durably across DoD with help from our next Military Principal.
- Organizing, subject to funding, a 2008 Summer Study on Factor Ten Engineering to assemble compelling cases, across the range of engineering disciplines and applications, of how integrative design can achieve order-of-magnitude energy and resource savings at generally lower capital cost. This new pedagogy, organized for my March 2007 MAP/Ming Professorship at Stanford (www.rmi.org/stanford), aims at the nonviolent overthrow of bad engineering.
- Refreshing RMI’s core intellectual capital in the 1999 book *Natural Capitalism* (www.natcap.org) by rechecking old and adding new cases, posting those and other supplements as hypertext, and reinvigorating corporate and business-school outreach.

In addition, my office is central to RMI’s innovation, new partnerships, existing research, and consulting practice areas, and will further strengthen our industrial consulting team over the next few quarters.

—ABL

big centralized resource. Think of the financial markets—people don’t put all their money into only one stock,” Joel noted. “They create a diversified portfolio of stocks that balance risk and return. Energy systems should do the same. Historically, however, we’ve thought about energy planning in terms of large, individual resources, such as coal plants. The big challenge is to fundamentally change the way energy planners, and our society in general, think about energy.”

The ER Team is currently undergoing minor changes. It will now be headed by Dr. Stephen Doig, who

brings tremendous expertise from his former roles as special advisor at McKinsey & Company and as an energy expert with the Air Force. Joel will continue to expand RMI’s leading-edge research efforts while working closely with CEO Amory Lovins.

Recent ERT clients include electric utilities Duke Energy, Pacific Gas & Electric, City of Palo Alto Utilities, Silicon Valley Power, Sacramento Municipal Utility District, Kansas City Power & Light, and the Nebraska Public Power District. Corporate clients include Texas Instruments, Wal-Mart, Frito-Lay, and mining giant Rio Tinto.

news on the web

RMI to Hold Three RMIQs on Front Range

RMI will be holding three of its informative RMIQ lectures on the Front Range. “RMIQ” (Rocky Mountain Institute’s Quest for solutions) lectures on climate and vehicle design will take place on Monday, Tuesday, and Wednesday (October 22, 23, and 24) in Boulder, Denver, and Fort Collins, respectively.

See www.rmi.org/RMIQs for more information.

Amory to Conduct Energy Workshop at Esalen

Later this fall (November 30–December 2), RMI Cofounder Amory Lovins will copresent a workshop titled “Advanced Energy Efficiency and Alternative Supplies for Profitable Climate Protection” at the Esalen Institute in Northern California (see www.rmi.org/Esalen).

RMI25: Celebrating Solutions

RMI25: Celebrating Solutions was a huge success and people are still talking about the various panel discussions, speeches, and other events. To view all the presentations, in video, log onto www.rmi.org/RMI25.

Looking Back from RMI50

In preparation for RMI25, Institute Cofounder Amory Lovins drafted a remarkably heartening strategic vision of where the world and RMI will be in his 85th year for delivery, at RMI’s 50th anniversary celebration. To explore how current and emerging threads of our work could interweave to create a richer, fairer, cooler, and safer world, check it out at www.rmi.org/vision...and in Snowmass in 2032!

THIS HOLIDAY SEASON SHARE SOLUTIONS TO COMPLEX PROBLEMS.

Honor your family and friends with a newsletter gift subscription or a contribution to RMI in their honor.

Please complete the enclosed reply envelope so that we may let them know of your thoughtfulness.



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