F E S T S C H R I F T

for Amory Lovins

November 2019

FOREWORD

Amory: Visionary, Genius, Colleague, and Friend

This book has been compiled to acknowledge the importance and value Amory brings to Rocky Mountain Institute (RMI), let alone the world. As RMI's cofounder, Chairman Emeritus, former CEO, former Treasurer, constant Trustee, and most recently, its Chief Scientist, Amory is the very essence of the organization. It is because of Amory that we and the 200-plus RMI staff are inspired by our work every day. All of RMI stands on the shoulders of Amory as we relentlessly pursue our mission, recognizing that it is Amory's extraordinary vision, global reach, and programmatic prowess that have helped make us strong and effective.

From Amory's seminal work on energy efficiency, first broadly read in his 1976 *Foreign Affairs* article, "Energy Strategy: The Road Not Taken?" to the articles he currently has in draft on his computer—with three huge screens for writing and editing—Amory has much to teach the world about energy. Actually, Amory could teach the world about a lot of things. One of the impressive qualities you learn about Amory when you spend time with him is how much he knows about just about everything. Is there someone in the group who speaks only Japanese? Amory can communicate with them. Is there a question about physics? Or the name of a poet? Geography perhaps? Or the uniqueness of bonobos and their skills? Ask Amory. A chord to be struck on the piano? He sits down to play, including pieces he composed as a child.

From Amory's home built in the early 1980s that showcases energy efficiency and solar energy along with integrated design components (which we formally refer to as the Lovins Green Home, but is more fondly known as the Banana Farm) to RMI's 2015 Innovation Center in Basalt, Colorado (the most energy efficient building of its kind in one of the coldest climates in North America, thanks to Amory's leadership and insistence that no central heat be allowed), plus hundreds of buildings and building-related projects in between on which Amory or RMI has been consulted (from the Empire State Building to the White House), Amory has exemplified high performance building expertise. He holds an honorary American Institute of Architects (AIA) title because of it.

Over the years, we have asked Amory to share with the RMI team how he approaches a problem that needs solving. "Starting with the

hardest step, I seek the right *question,* because it makes the answer self-evident. Start at the beginning, with original mind: What are we really trying to achieve, and why?" It is Amory's uncanny ability to understand, and propensity to explore, a whole-systems analysis that has become the bedrock of RMI's solutions-oriented track record for tackling and solving big systemic challenges—from figuring out how to design an aerodynamic vehicle that doesn't need oil to building the most efficient data center or chip manufacturing process to an aircraft carrier that reduces its fuel needs manyfold.

We are forever grateful to Amory for his vision, leadership, and continuing contributions to RMI. It is a place that has and will always have his indelible fingerprints everywhere. Our values, including our "unrivaled team," have been ingrained in our culture from the beginning. Our team members have been recruited according to Amory's description of "whom we seek" that includes the following: "What does RMI need and seek? Above all, exceptional talent and initiative. Not ordinary, not pedestrian, not conventional, not unremarkable. No drones, no drudges, no résumé-builders. We seek sizzle in your brain and fire in your belly. Why do you get out of bed each morning? What lights you up? If your passion is close to our vision and mission, RMI may be where you can grow to your fullest potential." What more can we say about how Amory, from the very beginning, wanted to surround himself with the best and brightest? It's special to see the gleam in his eye when he is surrounded by eager graduate students or even his senior colleagues when he realizes how smart and talented they are.

Amory's own talent and pure desire to make the world a better place is what has ensured RMI's success in being a best-of-class organization for over 37 years and counting. We will ensure that continues while Amory ensures that our team at RMI will remain sufficiently challenged and encouraged by his thought leadership and applied hope. As Amory's friend Wes Jackson has said, "*If your life's work can be accomplished in your lifetime, you're not thinking big enough.*" We agree and know that Amory will continue to think big.

Jules Kortenhorst,
RMI Chief Executive Officer

Marty Pickett,
RMI General Counsel and Managing Director

HONORING AMORY LOVINS

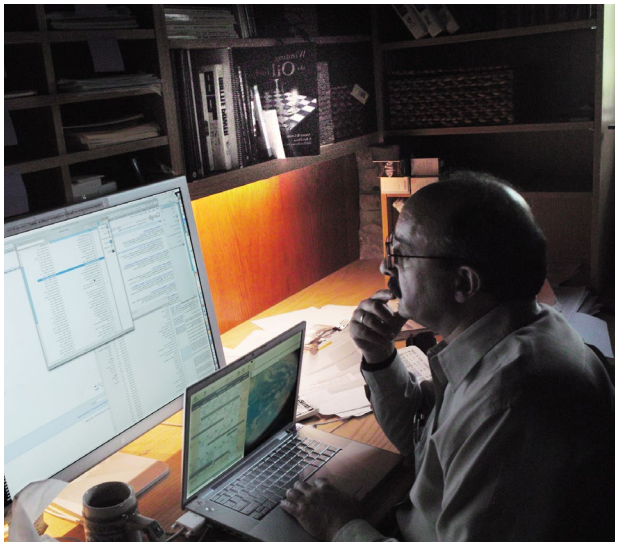
Fred Stanback

In my opinion, Amory Lovins is one of the smartest people I've ever known. He is passionate about his work and is always eager to tell others about it because he wants them to learn as much as possible.

I think I first heard of Amory in an *Atlantic* article over 20 years ago. Over the years, I've heard him speak at Duke, Catawba, UNC, in Raleigh, and at Appalachian State five times. I always learn something. No matter what topic Amory is talking or writing about, he has a practical suggestion for how to solve even the most complex problems.

I'm impressed by how much he knows about a lot of things. I recall one time when we were having lunch together, and he recognized an accent of the server. When he asked where she was from, and she answered "Russia," he began speaking to her in Russian.

Fred Stanback

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WILLIAM JEFFERSON CLINTON

October 15, 2019

Amory B. Lovins
Co-Founder and Chief Scientist
Rocky Mountain Institute
22830 Two Rivers Road
Basalt, Colorado 81621

Dear Amory:

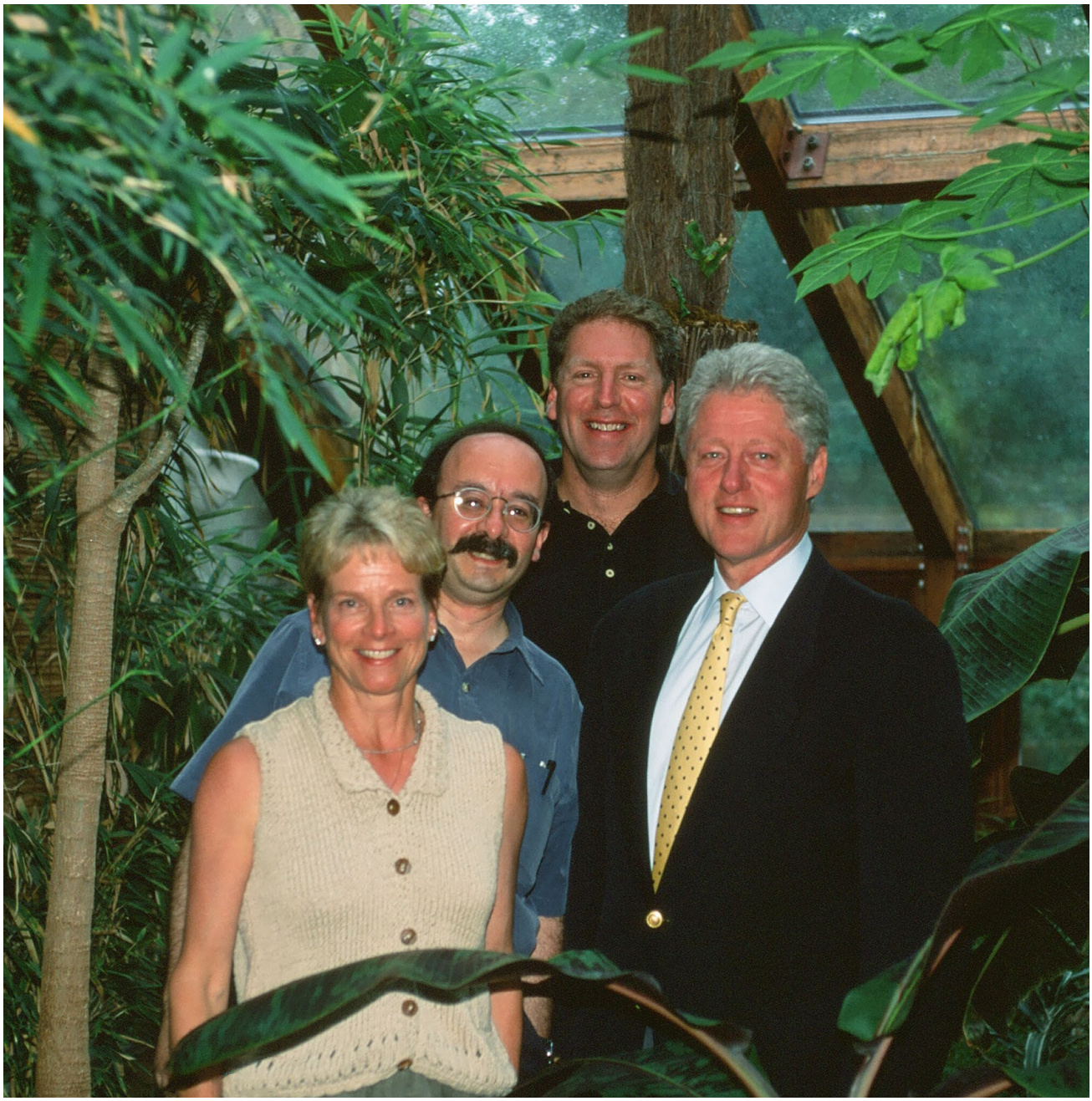
I'm pleased to join your colleagues and friends in paying tribute to your immeasurable contributions to the fields of renewable energy, conservation, and efficiency.

As you know, I've been a devoted follower of your work for more than 42 years, when as a young Attorney General I invited you to come to Arkansas and convince the Public Service Commission that an investment in renewables and efficiency would be safer, produce lower electric rates, and create more jobs than the planned construction of a nuclear power plant. The commissioners looked at us like we were crazy, but the evidence supported our position—and thanks in large part to your work over the last four decades, it is even stronger today.

Through my years as Attorney General, Governor, and President, I benefited immensely from your insights as I worked to advance policies that would better harness America's enormous potential to generate energy from clean sources. I also appreciated your team's work to green the White House, and later to retrofit our more than 100-year-old house in Chappaqua. And I have been deeply proud of the opportunities I've had to work with you and Rocky Mountain Institute since starting the Clinton Foundation, most recently in our partnership to help small island developing states transition to low-carbon economies.

Throughout your career, your emphasis on both the environmental and economic benefits of sustainability has changed the ways we talk about energy. You are a true pioneer, and I am grateful for your continued innovation, inspiration, and example. All my best wishes for many more years of good work.

Sincerely,



MY YEARS WITH AMORY...

Mac McQuown
September 24, 2019

My first connection to Amory traces to John Denver's Windstar Foundation, and the year was (I believe) 1976 in Aspen, Colorado. Amory and I were both on John's advisory board that gathered for the first time that year. So this begs the question of how did the advisory board come about, and how did I get invited onto it...and the same question applies to Amory, though I do not know the answer to that.

As for me, I had acquired a condo at Aspen Square Condominium Hotel in downtown Aspen in 1969 and began regularly skiing in winter and hiking in summer back then. Circa 1975, I met Annie Denver at the local Aspen Museum of Art where I was taken to an event by my skiing companion Michael Convisor, who I met through a mutual friend and resident of Aspen, Kit Mason, who I'd known for years. Michael and his wife, Barbara, had invited me to a fundraising event at the Museum, and it was there I met Annie Denver, but not yet John. About that same time, a former fraternity brother from Northwestern, Herb Hampshire, who had become a professor at the University of Pennsylvania, had become an advisor to John Denver, for reasons that I know not. Herb and I had remained friends over the years, and Aspen became a place we both enjoyed and, lo and behold, we got together there for dinner one night when I learned that he was taking up residence in Aspen to continue his "personal" advisory role with John. It was also then that I first heard about John's intention to found his Windstar Foundation that would focus on the environment. John had purchased a large ranch at Old Snowmass, some 10 miles north of Aspen, with an old house thereon that John had renovated into a suitable meeting location. It was here that the Windstar Foundation Advisory Board meetings would take place. Herb persuaded John to invite me to become an advisor, a proposition it would be difficult for me to turn down, for it was during the 70s that I had become sensitized to the problems in the environment that humans were creating for themselves.

There were a number of interesting and notable individuals on the Windstar Advisory Board, including actor Richard Chamberlain; environmentalists Bob Lewis and Stuart Mace (both of Aspen); John's confidant Tom Crum, also of Aspen; and Amory. Amory had been working around the topic of energy for some time. Shortly thereafter, his seminal *Soft Energy Paths* book came out on the topic... which I obtained when it came out, circa 1978 or so, and which I promptly read with great interest. I also found Amory himself a seminal thinker on a host of related topics that importantly trace to various technologies related to energy. These included internal combustion engines, public utilities, solar flux, and perhaps most especially, conservation of energy through efficiencies of various forms, like insulation to reduce heat-loads in homes and offices...a topic that Amory continues to vigorously, and most appropriately, emphasize. Around 1982, John "booted" me off the Advisory Council for quarrelling with him about how to materially advance the footprint of Windstar through, by my reckoning, goods and services and not just having people come to his sanctuary ranch at Old Snowmass. It was also around '82 that Amory and his then-wife Hunter founded Rocky Mountain Institute and built

their leading-edge home in Old Snowmass that required no heating or cooling other than the sun's photon flux. I found out about RMI around the same time that Leslie and I married, and we began making contributions to support the various research projects therein.

I have thus been on the sidelines of RMI from its early lean years until today, when RMI boasts the likes of 240 people led by CEO Jules Kortenhorst, and of course, Amory continuing as chief scientist. Amory's 2011 treatise on *Reinventing Fire* set out a roadmap on how to get off fossil fuels in the United States that remains the seminal driver of RMI. It was followed by a companion piece on *Reinventing Fire: China* that has facilitated the growing relationship between RMI and the Chinese people and government. Leslie and I still support RMI not only with contributions, but we actively promote its services among our growing set of business colleagues and friends who are concerned about global warming, and those who are working on technologies that can serve to convert human's energy sourcing from fossil fuels to renewables. It was three years before RF: China, in 2008, that Amory's book *Natural Capitalism* (coauthored with Paul Hawken and former wife Hunter) hit the bookshelves. Here, Amory was a key heralder of the notion that capitalism was the economic system upon which virtually all ancient human cultures took root, be that of one variant form or another. So, capitalism is a bottoms-up economic system, unlike socialism, which is a top-down imposition from self-proclaimed godlike humans. It follows that *Reinventing Fire* would be a bottoms-up *descriptive* process that occurs naturally, predicated on evolving science and technology and education, not *prescriptive* from supposed authorities. Amory's treatise served to reinforce my personal perspective on economics, and my skepticism around social planners' normative macroeconomic models of the Keynesian and related persuasions.

Indeed, Leslie and I have ourselves built a microgrid at our farm in Sonoma, California, Stone Edge Farm, that went live in August of 2018 producing essentially all of our electricity requirements with a zero-carbon footprint, and at zero marginal cost…seemingly one pace-setting bottoms-up exemplary initiative to which Amory, RMI, and we are so deeply committed. The microgrid, and the vastly more extensive efforts of Amory and RMI in China, seem destined to gain the attention of all who are committed to getting the global climate warming problem solved!

AMORY,

14 October 2019 while "on the road" in NYC—from your admirer and friend, Jane Woodward

I first spoke to you in fall 1980 when I took the class I have since taught (with others like Karl Knapp, Kirsten Stasio, Diana Gragg, and now Avery McEvoy)—now called "Understanding Energy"—at Stanford. The two textbooks were *Soft Energy Paths* by YOU and Dan Yergin's *Energy Future*. As a young geologist, this class and these books changed my life and turned me into "an energy person." I called you and Dan and introduced myself and soon after met Mason Willrich who funded Dan to write *Energy Future*. Anyhow, you became a "hero" and "thought leader" for me when I was 21 years old and remain so for me today almost 40 years later.

It was a huge honor to bring you to Stanford for the one-week boot camp, "Advanced Energy Efficiency," that Diana Gragg (lead TA then, delivers "Understanding Energy" now) and Holmes Hummel were so helpful in helping me organize. Our friend, Ralph Cavanagh, played a gracious role, introducing you to the Stanford community for your evening lecture series on "Advanced Energy Efficiency" that we filmed, put on CD, and later added Chinese subtitles so that RMI could distribute throughout China in the pre-YouTube/streaming world.

Beginning in 2018, you and I cooked up the wonderful Stanford class, held over spring break at the RMI Innovation Center in Basalt, "Extreme Energy Efficiency: E3," that you and your colleagues so wonderfully delivered to 40 Stanford students in 2018, and again in 2019—we anticipate the best yet in 2020.

In the summer of 2018, you and Marty graciously hosted my now 22-year-old daughter, Heidi, at RMI in Basalt, where she hoped to help and learn—and did both. She happened to be in Basalt for two special things—the opportunity to get to know Judy, who kindly offered Heidi a place to sleep and park her Subaru, and for Heidi to help out with the 35th anniversary celebration and get exposed to many influential followers of your thought leadership.

Amory, I have some special memories and I look forward to more:

When you stayed in our casita in 2007 and you were so lovely with my daughter Heidi, then ten years old, observant, shy, and fascinated with you—and you went to some length to visit with her, show her orangutan photos, and talk with her. We love that memory.

When I helped bring you Jack Welch's speech coach to help you simplify and clarify your messaging of "The Oil End Game."

Hearing you talk about JB Straubel, whom I met when he was a freshman at Stanford, and you met soon after—and my delight that he and Boryana co-sponsor the E3 class at RMI with me.

Bringing Karl Knapp (my teaching colleague from Stanford) and two high school science teachers to visit your home in Snowmass—for ping pong, bananas, and a wonderful visit. Sadly, we lost Karl to ALS last year.

I am thrilled to have created the Schneider Sustainable Energy Fellowship program at Stanford with Peggy Propp and that RMI was an early partner and host of Schneider Fellows.

I have taught at Stanford now for 28 years, and I have been channeling your thought leadership wherever and whenever I can.

I am grateful to you, Amory! Keep up the great work—take care of Judy and she you—you are both a vital renewable energy resource to us all. I hope you will continue to lead us all on the path of "Applied Hope."

Love, Jane (and Heidi)

HOW DO YOU BEST EXPRESS APPRECIATION FOR YOUR MENTOR?

Bill Browning

I first met Amory in 1982, when I was a student and teaching assistant for a professor in the College of Environmental Design at the University of Colorado. Amory and Hunter came to teach a summer course as they were beginning construction on the house in Snowmass. The course was a summation of their thinking and the materials that influenced them. Wide-ranging and sometimes a bit irreverent—where else would Edward Abbey's *Monkey Wrench Gang* appear on a resource policy syllabus? Among the discussions was an in-depth exploration of an essay on conveying propaganda from a WWII British intelligence officer entitled, "Tell the Truth." The key strategy was to convey the actual data and always be conservative on your numbers.

The experience of running away from school on weekends of my senior year to work on the house was wild. Twenty-three people, one bull terrier, and a Lanier word processor the size of a basement freezer, occupying a doublewide mobile home on the bank of Snowmass Creek. Everyone was working on a house that was supposed to be built like a barn-raising and completed within six months. After graduation, I settled into a tipi across the street at the Windstar Foundation, and spent much of my time with the RMI crew.

After about four years, I moved across the street as a part-time intern at RMI. The office area was crowded and staff meetings would be around the kitchen table. At first it was a bit intimidating to have Amory look over your shoulder while you were typing and ask about a reference. Particularly when he would say, "Oh, I have a better one," and then proceed to type in the full citation including the page numbers. Over time, one comes to realize how broad an intellectual net Amory casts. Diverse threads of knowledge get woven together to create new ways of conceiving solutions.

The concept of "tunneling through the cost barriers" turned the process of pricing a building upside down. Driving efficiency to the point of eliminating components and whole systems and therefore lowering the overall cost is still a revolutionary thought. Backed up with good numbers and well documented were qualities essential to an RMI publication, especially when it was going to generate controversy.

Having documentation sometimes as long as the main body of the publication seemed extreme, but it was a lesson well-learned. My team and I at Terrapin published a white paper that posited that demolishing and replacing mediocre mid-century Manhattan office buildings would be better for the environment. Following Amory's model, we included all the formulas, data, and calculations in the appendices. The paper highly displeased a number of folks, and while roundly attacked on a philosophical basis, no one questioned the numbers.

But Amory's real contributions are more than concepts and documents. He is a believer in economist Kenneth Boulding's comment, "What exists is possible." Amory has built the prototypes; the house on the creek, the Hypercar, the office in Basalt.

Amory gave support to new explorations. When I proposed an effort to work with real estate developers, many staff and board members were strongly opposed. With his support, we launched one of the first green building consulting practices. We were able to apply RMI's thinking to the White

House, Pentagon, various national parks, the Sydney 2000 Olympic Village, and many other projects. RMI's stature put us at the table with the American Institute of Architects' National Committee on the Environment and the founding of the US Green Building Council.

The accidental banana farm has influenced many. I have come to realize that the mob of orangutans in the foyer is an expression of a deeper compassion for all life, Amory expresses that with a profound sense of love and equanimity.

Thank you!

Bill Browning

ODE TO AMORY LOVINS

Marcia Angle

There once was a young man so bright
He enlightened everyone with his Light
He could synthesize data
Across multi-disciplinary matters
Young Amory well expressed his insights…

Half a century of prescient publications
helping others see fossil fuels' ramifications
Fleeing famous, prestigious places
(and their maddeningly slow paces)
He became an energy expert among nations

Years of ingenious and hard work ticked by
Until Amory founded RMI
Cutting-edge scholarship
Travel and authorship
Applying his brilliance to do Right

His reputation for genius grew
Drawing in colleagues and fans anew
Young minds soon gravitated—
To RMI they migrated,
Creating a "tank of think and do"

Expanding RMI's influence
(transportation, construction, defense…)
He traveled globally
Inspiring others to see
How his smart ideas all made good sense

He traveled to DC and to China,
to Europe, and to North Carolina,
Preachin' a gospel of renewal
Condemning old fossil fuels—
Inspiring others in this endeavor

A polymath, he notices all!
As our houseguest, I can well recall
His enthusiasm and good cheer
Erudite explanations quite clear
Commenting on our tankas from Nepal

Second perhaps to the orangutans
We joined the club of his most ardent fans
Glad to say happy birthday!
Amory still leads the way!
We await news of Amory's next plans…

BANANAS CAN INDEED GROW IN THE ROCKIES

John Fox

I first became aware of Amory Lovins in 1978. I was an engineer in Ontario Hydro's nuclear generation group, which at that time boasted the largest nuclear program in North America. Hydro had 30 reactors operating, under construction, or in some early design stage. The anticipated surge in demand for the uranium fuel to support this program had led the provincial government of Saskatchewan to convene the Cluff Lake Board of Inquiry to examine the economic, social, and ethical implications of such large-scale mining activities. Based, I assume, on the recent publication the "Soft Paths" paper, Amory was invited to participate. His testimony was met with less than universal acclaim. In a subsequent journal article entitled "From Love-Ins to Lovins," the authors opined that the concept of Love-Ins and the concepts of Lovins were equally heretical. It was one of the few things they were right about.

In 1988 I was involved in market research at PG&E. At that time utility regulatory interest, and therefore utility management interest in energy conservation and efficiency that had been generated by the oil embargoes of 1970s, had begun to ebb. Amory was a frequent participant in California energy and regulatory forums with his fire hose delivery of innumerable facts, studies, and hypotheses. At that time, a colleague asked me to attend a meeting with Ralph Cavanagh of the Natural Resources Defense Council (NRDC), who he described as, "a little bit crazy but always interesting and entertaining." Ralph was trying to rekindle regulatory and utility enthusiasm for conservation and efficiency that was lagging, due in part to declining oil prices. NRDC and many other environmental groups relied heavily on RMI research to support their advocacy.

Ralph's proposal was simple in concept—let the utilities keep a share of the value of the proved savings from their conservation and efficiency programs. This was an anathema to many environmental, consumer, and regulatory staffers. Ralph cajoled, hectored, and brow beat the potential participants until he got agreement from all the significant participants to engage in a collaborative process to ramp up conservation and efficiency programing, while rewarding utilities for cost-effective delivery. The California Collaborative, as it was called, was largely successful for all parties, and relied heavily on RMI research to support program selection and targeting.

After we received regulatory approval for the Collaborative roll out, Ralph approached me suggesting that I should join the RMI board. When I questioned his authority to make the offer, Ralph responded with his usual, "surely Amory will agree that this is important."

Shortly thereafter it was agreed that I would meet Amory at Stapleton Airport and fly with him to spend a weekend in Snowmass to be sniff-tested by some of the folks there. At that time there had not been a utility type on the board and suspicions were aroused.

I met Amory in a waiting lounge at Stapleton. Never one for small talk, Amory said hello and that he had a recent and compelling paper I needed to read. Good fortune had presented Amory with a small, battery operated single page printer that he set up on the floor of the lounge, connected it to his computer, and proceeded to feed in page by page until the paper or the battery ran out. I forget which.

My audition was evidently successful. I learned that bananas can indeed grow in the Rockies, that Amory is an accomplished piano player, and that RMI was an organization like no other. My tenure on the board started in 1992 and lasted 16 years. The first six years or so were a balance of expanding programming and staving off bankruptcy. We were never more than 60 days from insolvency, often much less. Amory described fundraising as a hunter/gatherer exercise, always believing that someone would step up at the last minute to help meet payroll. They always did.

Farley Sheldon was the den mother, cook, and fundraiser in the early years. Fundraising had not been institutionalized. Money trickled in and Farley would periodically solicit by mail, “putting all our begs in one ask-it,” as she said.

Organizational growth was steady but slow. Competitek was spun out as a for-profit subsidiary. Under Jim Newcombe and Wayne Greenberg, it grew impressively to the point it was acquired by McGraw Hill. The sale proceeds provided RMI with its first financial cushion and provided the basis for greater organizational stability and program growth.

Amory's early recognition that environmental sustainability is not possible without economic sustainability led RMI to focus on markets and market mechanisms, and making the case for free market adoption of emerging cleaner, efficient technologies and practices.

It is interesting to go into Home Depot and realize that the lighting shelves are dominated by high-efficiency products of all kinds that now sell without subsidies, and to remember Amory carting around his enormous suitcase full of compact fluorescent lights (CFLs) and buttonholing who would listen, making the case to skeptical audiences. It is interesting that most architect firms, once the bulwark against efficient building design, are now requiring their staffs to become LEED-certified, because providing efficient building design is now both a competitive advantage and a business necessity. Improved appliance efficiency standards, industrial process improvements, and automobile design have all been abetted by the thought leadership and practical participation of RMI and Amory.

The wisdom behind the message and the persistence in its delivery have prevailed. It was great fun to be along for the ride!

John

A TRIBUTE TO AMORY LOVINS AND ROCKY MOUNTAIN INSTITUTE

Charles F. Babbs, MD, PhD

Climate change caused by human activity is the defining challenge of our time. In the face of this challenge, some of us are in denial: this can't be happening; the world is too big; the science must be flawed. Some of us are angry: we've been screwed, and those evil perpetrators must be punished. Some of us try bargaining with the Universe: if I just decrease my personal carbon footprint, then maybe all of this will go away. Some of us are in deep depression: we're doomed, and no one is going to do anything to avert the apocalypse.

Amory Lovins is actually doing something—something practical; something achievable; something scalable from home, to neighborhood, to village, to city, to nations rich and poor, east and west; something that works with today's off-the-shelf technology; something compatible with human nature; something acceptable to persons of all political persuasions; something that produces short-term wins rather than deferred gratification; something that requires no future miracles or scientific breakthroughs; something that makes money in the short term. As a young scholar in the 20th century, Amory had the prescient insight to tackle the most significant problem that would face human civilization in the 21st century, way before most scientists and intellectuals saw it coming. Good thing he started early. It takes decades for most of us to solve ordinary circumscribed problems, let alone global and existential ones.

Those of us who support RMI are fortunate to be able to contribute to the potential salvation of our species, when so many others have devolved into denial, anger, bitterness, and despair. We actually **can** make a difference, because the energy problem is so pivotal and central to many of the grand challenges of the 21st century. If we have abundant, clean, renewable energy, we can solve critical global problems that threaten out species. We can solve fresh water insecurity anywhere near a seacoast by turning seawater into fresh water through distillation, powered by renewable energy. We can solve food insecurity by building multi-level urban farms, like high-rise organic car parks, with 24-hour broad-spectrum LED lighting, powered by renewable energy. We can generate nitrogen-containing fertilizer for global agriculture from the limitless nitrogen in the air using the methane steam reforming process to produce ammonia, powered by clean electricity. We can solve urban pollution, and bring down cancer deaths, by converting to all electric vehicles. We can generate portable hydrogen-oxygen fuel for transportation by electrolysis of water, created with clean electricity. We can solve national insecurity to a large degree by eliminating oil wars and national competition for scarce energy resources. We can solve the threat of massive coastal flooding and

the displacement of hundreds of millions of people due to sea level rise by minimizing present and future carbon emissions. We can adapt to predictable sea level rise from greenhouse gasses already in the atmosphere by creating Dutch-style lowlands pumped dry using renewable energy. With abundant renewable electricity, it is even possible theoretically to attack the major culprit of global warming itself, through electrochemical carbon dioxide reduction that transforms CO_2 into useful end-products, such as methanol, aldehydes, ketones, and hydrocarbons. Or perhaps more elegantly, we can leverage biology and evolution to convert atmospheric CO_2 into useful complex carbohydrates using fast-growing algae under 24-hour artificial light. All of this and more was understood by Amory when some of us were wearing bell bottom pants, and some of us were still wearing diapers.

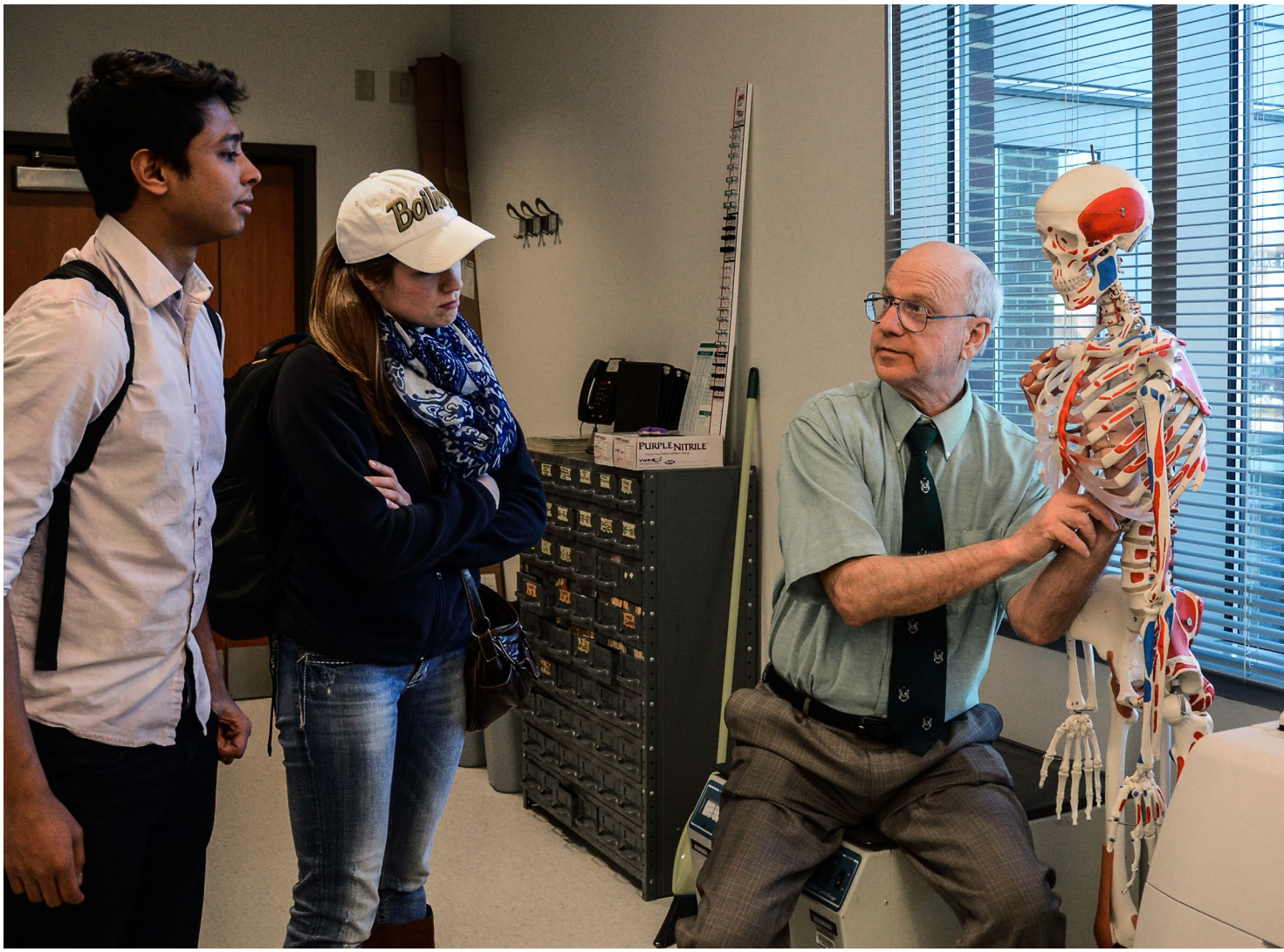
Someday, ages and ages hence, Amory Lovins will be remembered as the Thomas Edison of our time. Edison created many enabling technologies of the 20th century that led to the modern information age, including distributed electric power, the phonograph, motion pictures, and the telephone. Amory has already envisioned and demonstrated enabling technologies of the 21st century that may well lead to an age of sustainable energy, including the superefficient Hypercar, energy-sipping or zero-energy buildings, techniques for saving electricity more cheaply than making it, and a coherent plan for a vibrant world economy needing no oil.

Amory is truly a global treasure and an honor to have as a colleague and friend. Like Edison, Amory is a practical genius. His creativity generates working physical inventions, while his leadership, entrepreneurship, and subtle "institutional acupuncture" bring them to market, creating wealth, protecting the environment, and reducing global conflict. Paul Baran, a winner of the US National Medal of Technology and Innovation has estimated that Amory's energy innovations have probably increased historic and current American national wealth by at least $1trillion—not to mention their value to national security and the environment. Now there are RMI's global initiatives, including Reinventing Fire China and India Leaps Ahead. This re-framing of the larger environmental issue as a technological, not a political, problem allows humans to do what they do best: invent and solve technical problems, rather than what they do worst, act collectively in large numbers to solve political problems. Brilliant!

Our Uber Chief Scientist has shown us how daunting, even despair-invoking, global challenges

can be met by creative application of smarter technology. Like Thomas A. Edison, Amory B. Lovins has discovered foundational technology for a new century. Like Archimedes, Benjamin Franklin, and J. Robert Oppenheimer, he has applied his talents not only to civilian, but to military applications to serve his nation. Like them too, he does solutions, not problems, transformation, not tweaking. He is a pioneer we hope and pray will continue to inspire the successful transition to a renewable energy economy in the 21st century that works better and costs less—and that just might save human civilization in the process.

We who support RMI at this critical time in world history are lucky and blessed to have found a way, through this amazing organization, to make the world a better place for our having lived in it. Most people don't know about RMI. Most people don't know that when history is written 100 years from now, Amory Lovins will be regarded as an intellectual pioneer in a league with Galileo, Newton, Edison, the Wright Brothers, and Einstein. But we know. With deep satisfaction…**we** know.




12x
Ostion
CONSTRUCTORA
DIVISION EQUIPO DE
S.A. de C.V.
SIMEL
SALVAMENTO

IT HAS BEEN A JOY

Jeff Tannenbaum

More than 20 years ago, I read an article about a visionary, optimist, and clean energy/efficiency innovator who lived off the grid somewhere in the mountains of Colorado. At the time, I was looking for ways to better contribute to society, and so I tracked down the subject of the article, Amory. A few weeks later, I found myself weathering a blizzard as I navigated my rental car to his Old Snowmass house and headquarters. Eventually, I arrived at a beautiful, curvy structure that Antoni Gaudí would be proud of. I knocked on the door—uncertain if I was at the right spot—and the big door swung open, and there was Amory and a bevy of orangutans.

That was the beginning of many years of insight, knowledge, and tremendous inspiration provided by Amory. I don't have many heroes. Amory is one. He inspired me to get more involved in bipartisan energy policy work, starting with a bipartisan symposium at NYU Law focused on energy independence. Shortly thereafter, I reached out, and he was helpful in my early days of building the PACE industry (including flying out to join me at a Milken conference), and then again building sPower—the utility scale solar industry with the corporate buyers group (which led to the largest solar farm in the eastern US), and more recently getting busy in Puerto Rico.

It has been a joy to work with Amory and to marvel and learn from his work. I have learned a great deal just through observation. At the top of the list is his different approach to problem solving. Amory sees problems and solutions very differently than most people. His "whole systems/design thinking" approach empowers him to design elegant solutions not steeped in what has been done but what can be done. He thinks very, very far into the future. He is non-partisan—a citizen of the world—and uses this broad embrace of humanity to bring opposing sides and reluctant leaders toward positive change. He is an optimist, and this optimism is based upon actionable ideas. And he has the wisdom to hand his big actionable ideas to changemakers that can change the status quo, such as Walmart, the Department of Defense, and other groups, that merely through their adoption leads to industry change.

I am so grateful that I weathered the blizzard 20-plus years ago (and later visits with altitude sickness!). Much of the success I have had in clean energy can be credited to Amory. Obstacles are just speed bumps. Unusual alliances can be forged, e.g., Tea Party Republicans for energy efficiency! Big ideas are possible. It is this last point that I believe is the most powerful: Almost anything is possible when you combine clear thinking + optimism + tenacity + a unique approach to alliances.

Amory, thank you for the gift of the possible and your inspiration. I look forward to cooking up some more transformational ideas!

XO & a big orangutan hug!

Jeff Tannenbaum

RIGHT WAY WAS BACKWARDS

From Bill Joy:

I must have met Amory shortly after I moved to Aspen nearly 30 years ago—I don't remember exactly when. Thinking about it now, it seems like I have always known him.

I was trained as a computer scientist and had at best a modest understanding of energy and the underlying physics and chemistry that drive so many of the issues that Amory has so long cared about, and which now so greatly concern us all. From the beginning, I greatly enjoyed our conversations. I would throw out seemingly intuitive but actually naive ideas and get great guidance from Amory, in the form of incredibly useful ways to think about problems.

For example, I was talking with him about how to save energy on moving a boat I was building—specifically, about ideas for more efficient engines and propulsion. To this, he immediately replied that one should first reduce the power required and only then worry about providing the energy efficiently. Thus, think about a more efficient hull shape, hull appendages, and the like to reduce the power required before moving on to more efficient ways of transferring power to the hull (e.g., more efficient propellers). And after these and perhaps other steps have been applied and have downsized requirements, only then consider how to provide the required power. The right way to think about the problem was "backwards" from the way I was thinking of it!

Shortly after this conversation, I became very concerned that the technologies available to deal with what would come to be known as planetary boundary issues were woefully inadequate, and I was given an opportunity to work with an old friend, John Doerr, at his venture capital firm KPCB, which had recently had a turnover of senior partners. Joining KPCB, I helped start a cleantech practice, where we took many of Amory's ideas—for example, seeking efficiency as well as generation breakthroughs—and combined them with a DARPA-like focus on grand challenges to start breakthrough ventures. Realizing that

what was needed was planetary scalable and aggressively better solutions, we made a list of 25 possible huge breakthroughs and started to look for ways to achieve them.

We continued this work for over a decade, during which time, while working in California and around the world seeking solutions, I would travel extensively away from Aspen. When back in Aspen, I much valued when Amory and I would regularly get together for long and engaging conversations over dinner, often at Matsuhisa, to discuss our mutual adventures, discoveries, and proposed next big things. These conversations were incredibly important to me and helped me keep going in a time, like now, when there were, and are, far too few concerned fellow travelers.

Without Amory's insights and patience to teach me about energy issues, I would not have been able to do the climate work I hope will turn out to make a difference. Amory and RMI worked with me, just before I started at KPCB, on attempting to cut the energy and resource footprint of a personal boat project, the sailboat Ethereal, by 50%. For Ethereal, RMI organized a design charrette from which the learnings, network of people, and ideas and approaches fed directly into the work we did at KPCB on cleantech. Amory and RMI thus were the first-stage booster for our decade-long cleantech effort.

I greatly value Amory as a longtime friend, essential teacher, and forever fellow traveler.

Congratulations, Amory.

IN PRAISE OF AMORY LOVINS

By Ralph Cavanagh, Natural Resources Defense Council (10/2/19)

My first real job was a one-year fellowship with the Natural Resources Defense Council (NRDC), which began in September 1979. NRDC's Western office was severely understaffed, and I was assigned virtually exclusive responsibility for advocacy regarding the future of the huge, complex, and contentious electrical energy system of the Pacific Northwest region, about which I knew nothing whatsoever. I grew up in New Hampshire and did not so much as cross the 100th meridian before accepting my NRDC fellowship. It might not have been renewed but for Amory Lovins.

At the top of my first background reading list at NRDC was a fierce denunciation of the environmental obstructionism that threatened urgently needed coal and nuclear plants intended for dispersal throughout the Northwest's 300,000 square miles. The diatribe had been written by the then-administrator of the Bonneville Power Administration (BPA), Donald Paul Hodel (later secretary of energy and secretary of the interior). Hodel's "The Prophets of Shortage" was a slashing diatribe, infused with fear about America's future and rich in invective against opponents of the author's vision. The second item on my reading list was *Soft Energy Paths*, which was something else entirely. It was calm, scholarly, and relentlessly optimistic. And its argument was what had most roiled Hodel. I later became friends with both of them, but Amory entirely prevailed in their epic early debate, as Don himself would almost certainly acknowledge. America ended up taking the soft energy path, for all the right reasons. Its regulated energy utilities became the nation's essential clean energy partners. And one of Hodel's successors at BPA, Peter Johnson, accepted Amory's invitation to become the first board chair for one of RMI's subsidiaries (E Source).

Given my initial NRDC assignment, it was predictable that I would first meet Amory in the Pacific Northwest. This happened around 1980, before he had decided where to site Rocky Mountain Institute. I was working with regional clean energy leaders to create what became the Northwest Energy Coalition, which still thrives today under the leadership of Nancy Hirsh and Wendy Gerlitz as a uniquely diverse and compelling voice for soft energy paths.

Amory may not realize how much his uncompensated appearances at public forums (then and in the years immediately following) meant in legitimating and empowering a cluster of twenty-somethings with then-implausible faith in the power of energy efficiency. The results are partly visible in the Coalition's Model Conservation and Power Plan (1982), which includes numerous Lovins citations and helped replace a giant thermal power plant construction program with something much better. Almost forty years later, the region looks back proudly at four decades of energy efficiency investment that displaced the equivalent of eighteen giant coal-fired power plants at less than one-third the cost. As a result, the region's annual electricity bills are more than four billion dollars lower. Classic Lovins.

But achieving those results meant overcoming fierce skepticism and opposition. My blueprint for how to do this is another volume with Amory's name on the cover (still my favorite): AMORY LOVINS AND HIS CRITICS (Friends of the Earth, 1980). Here Amory fearlessly collected all the strongest critiques of his published work, citation by citation and paragraph by paragraph. And then, paragraph by paragraph, he meticulously rebutted, analyzed, and persuaded—and yes, eviscerated, but always respectfully. The book is a model for rigorous discourse about high-stakes public disputes conducted in a spirit of inexhaustible goodwill, good humor, and commitment to the public interest. Amory has done that better than anyone else, longer than anyone else. And I rejoice in the certainty that he is nowhere near finished.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Eric Rasmussen, MD, MDM, FACP
12 October 2019 Ohrid, Macedonia

As I write this note remembering Amory, I'm sitting on a balcony in North Macedonia overlooking a cool and sunny October afternoon on Lake Ohrid. Several of us are at a NATO meeting, and Lin Wells is with me. We've a lively table and we're sharing Amory stories—professional, personal, and global—remembering just how remarkable our beloved friend really is.

Twenty years ago or so, about 1997, I was the fleet surgeon for the US Navy's Third Fleet based in San Diego, California. At that time, the commander of Third Fleet was Vice Admiral Denny McGinn. Admiral McGinn, like his predecessor VADM Herb Brown, was aware that the US Department of Defense was concerned about the turn of the millennium and a technical malfunction becoming known as "Y2K." I was responsible for humanitarian and human security issues at Third Fleet, in addition to my medical responsibilities for ill and injured sailors and Marines, so I was tasked by Admiral McGinn with assessing the likely impact of Y2K in the humanitarian space. My research, focused on large-scale energy disruptions potentially compromising basic life functions for large swaths of the population, soon led me to Amory.

After discovering—and devouring—Amory's *Brittle Power*, I was attending the Wilderness Medicine Society Conference in Snowmass when I found that Rocky Mountain Institute was right… over…there! I'd had no idea. So, with no expertise and only a

vague sense of what I was asking, I showed up, with no warning, at the Banana Farm one day and was warmly welcomed by a patient but puzzled Amory. We sat down to talk Y2K over tea.

I learned a lot that day, but a big slice of what I learned was that I really wanted to know this man. It was my first experience with what I later realized was a Taoist living their philosophy every moment, and it changed me profoundly. Amory was not only intelligent—clearly a genius by any metric—but he was also kind, patient, humble, affectionate, and striving to live in harmony with everything around him. As a US military officer with three tours in Bosnia at that point, being exposed to such a personality was unusual.

We found reasons to do things together, and they were each interesting, productive, and fun. We decided to look at the propulsion systems of Navy ships—now known as the Princeton Study (the USS Princeton [CG-59], a guided missile cruiser—not the university), and we held a charrette together in Santa Barbara on "Rebuilding Refugee Camps." I participated in "blue sky" sessions with the RMI board, and I wrote essays for RMI publications. It was a valuable time for the US military to be exposed to Amory's thinking, and I was pleased to be one facet of his exposure to military operations in the humanitarian space.

We also found reasons to meet useful and interesting people together. We noted a mutual admiration for Janine Benyus shortly after she published her seminal Biomimicry. We found value in together meeting Dr. Lin Wells, later the Chief Information Officer for the Department of Defense and eventually Assistant Deputy Secretary of Defense for Networks and Information Integration (ASD-NII). We came to know Dr. Dave Warner, an M.D./Ph.D.

fascinated by Amory's work, who brought his thinking into rural Afghanistan. We began to enlarge our discussions with Vice Admiral Dennis McGinn even after he left Third Fleet, and Amory's influence led Denny to a serious focus on sustainable and resilient energy paths for the US Department of Defense. Denny was later frequently heard to echo Amory's thinking, with attribution, when interviewed by CNN during the early months of the Iraq War.

On the list of Amory's accomplishments during the early 2000s, while I was in Afghanistan and Iraq, was his determining the true, fully burdened cost per gallon of fuel delivered to a war zone. That study transformed the way the US Department of Defense looked at energy delivery. A few months after those astonishing numbers came out, the Army, Navy, and Marine Corps began to seriously look, for the first time, at alternative energy sources for forward operating bases.

> "A society becomes great when old men plant trees in whose shade they know they will never sit."

About that time, in a closely related effort, Lin Wells, listening to Amory's ideas and systems relationships, began to talk about fuel as a field-based security issue in Iraq and Afghanistan. Building on Amory's fully burdened fuel cost study, Lin developed a new currency he called a "DAB." A DAB was a Dead American Body—a tragic reflection of the impact of fossil fuels requirements in a war zone. In a mission briefing, Lin would describe a fuel convoy as likely to be a three-DAB trip. A generator repair was a two-DAB effort. An electrical transmission tower sabotage repair would be a four-DAB mission. The staggering cost of fossil fuel delivery to forward bases in Iraq and Afghanistan—in time, treasure, and humans—was made clear, for the first time, in that "fully burdened fuel cost" study, and distributed renewables became an inevitable military transformation. Amory did that.

In the course of those years I was relatively close to Amory, serving as a senior fellow at RMI, and so had reason to bring topics and people to RMI's doorstep. Late one evening in Aspen, several of us were sitting together in a bar after a draining day of planning meetings. Amory decided it was a nice moment to play, sat down at a keyboard in the bar, and let loose. Jaws dropped around the room. I suspect relatively few people know that Amory could have been a professional musician, but I can tell you he's a joy to listen to when you need to let everything else just drop away.

I'm a physician, and around 2005 I began to learn a different side of medicine from Amory, hearing in detail about the efforts he was pursuing and the theories behind those antioxidant (and other) supplements. We began a discussion around improving the immune competence of an entire population as a method for reducing the risk of an unchecked pandemic. At the time, I was looking at bioweapons and the mitigation strategies we might employ in response to a release, and Amory took me in an entirely new direction that's since led a lot of people to very productive avenues of research.

A few years later we were looking at Willie Smits' work at Samboja Lestari in East Kalimantan, and I was again discovering the remarkable breadth of Amory's worldview. Willie is an astonishing biologist, with PhDs in two different languages, and had devised a method for resurrecting dense and complex tropical rainforest in areas of Indonesia where slash-and-burn forest clearance had left nothing but cyanide-laced razor grass. Amory had correctly identified another world-changing human in Willie and was quietly, almost invisibly, ensuring he had every opportunity for success.

Amory and I also came to know the mycologist Paul Stamets, and between the three of us, we've supported several cancer patients with adjunctive therapies that may well have been helpful (no claims—just anecdotes), and we learned to view any patient as the complex beings they are. While conventional allopathic medicine is often necessary, it may not always be sufficient, and the chance we've had to learn together about the modalities now unfolding has been a revelation to me. It's also been rather wonderful to see how many people have been helped by the cool things we know about and can offer as adjunctive support, in concert with conventional care.

As the world has continued to turn, Amory and I have shared time together working on the ground in China and Scotland with smart

friends, while offering unrelated support to brilliant inventors always on the edge of financial disaster. We've collaborated around New York superstorms, Nepalese earthquakes, Standing Rock blizzards, Puerto Rico hurricanes, and transformations in the energy profile of the Roman Catholic Church. In each, I was able to see still more examples of Amory's glowing intelligence, selfless energy, remarkable kindness—and that he's consistently a lot of fun to be around.

There is a Wikipedia article. There are prizes. There are buildings named after him. There are institutions named after him. There are probably CHILDREN named after him. He has, in his own quiet way, over decades of rigor, honesty, compassion, curiosity, sly humor, and a wonderful felicity of expression, managed to change the world for the better in every single topic I've seen him touch.

He occasionally refers to a few of us as his "much higher primates," acknowledging that, given his druthers, he'd often rather be an orangutan, deep in an untouched Kalimantan forest. We, in turn, look to him as a model of just how good humanity can be. Amory is, and has been as long as I've known him, the most complete expression I've ever seen of what our species can produce. He's taught me, among many other things, that modesty succeeds and that credit can be usefully shared. He's reminded me that curiosity is a critical component to a life of service, and that the guidance of the Tao can do more to ensure a gratifying life than anything else we've found.

I am a calmer, happier, gentler, more effective, and more grateful man because I've let myself be shaped by what I see in Amory. I work, and enjoy my marriage, and raise my children, just a little bit differently because of the influence I've let Amory have over me.

He knows little of this, of course. While he knows we've been good friends for many years, only here am I telling him that he is the single most admirable human I've ever met, and that my life would be much poorer without him in it. Demi, my wife of more than 35 years, is very aware of the truth of this, and fortunately loves the man as I do.

Happy birthday, Amory.

Demi, Melissa, Faith, and I send our love, hugs, and wishes for many more years to share.

Eric

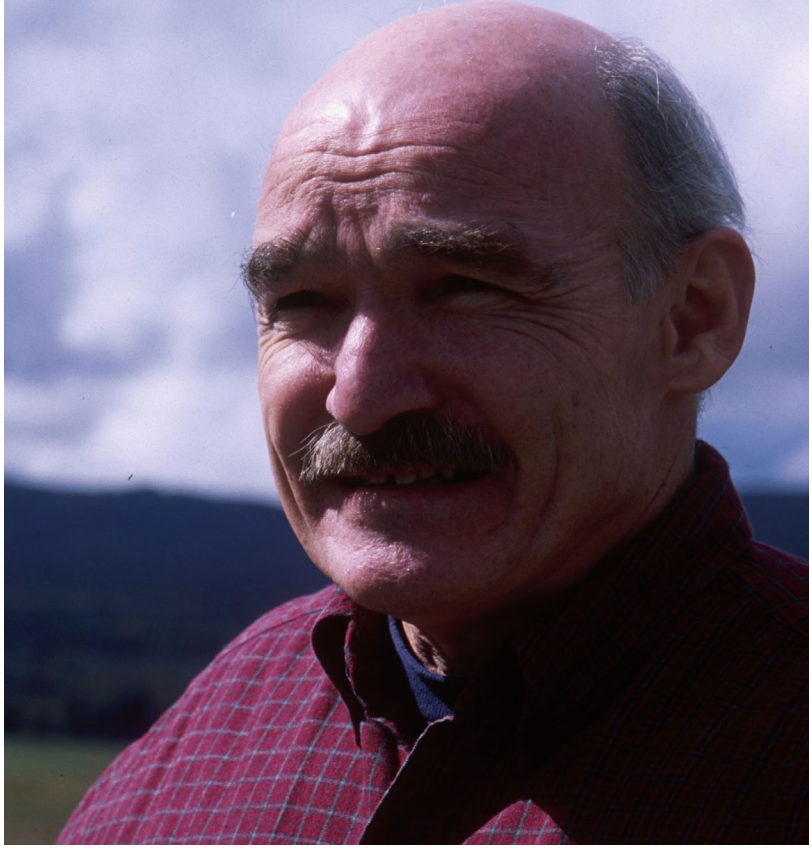

RM125

SEA STORIES ABOUT MY GOOD FRIEND, AMORY LOVINS

By Denny McGinn

I first met Amory in 1990 in Newport, Rhode Island, when I was a Chief of Naval Operations Fellow in the Strategic Studies Group. Ever since the Arab oil embargo, beginning in 1973 when I was a young Lieutenant and Navy carrier pilot, I had developed a very keen professional and personal interest in the United States' dependence on oil and the serious implications for our national security, economy, and quality of life. I was aware of, and especially encouraged by, the good work that Amory and the RMI team had been doing, especially related to energy efficiency. So when I learned that Amory was coming to the Naval War College to have an in-depth discussion about energy with the Strategic Studies Group, I was very eager to meet him and learn more about RMI's work.

After a brilliant and high-level discussion about energy and national security that Amory conducted with our group of Marine Corps colonels and Navy captains, I approached him with several interesting, energy-related sea stories. I first told Amory that for two years before being assigned to my one-year sabbatical with the Strategic Studies Group, I was the commanding officer of USS Wichita, AOR-1, an operational fleet oiler. The "Wicked Witch of the West," as we lovingly called our Pacific-based ship, held over seven million gallons of petroleum cargo, a mix of jet fuel and diesel marine. We would deliver our cargo fuel at high pressure through seven-inch diameter hoses using underway replenishment equipment to ships in various carrier battle groups. The ships would be steaming side by side at 12 knots with an average distance of 160 feet between them. While energy efficiency at sea was always on our mind, it was primarily focused on operational mission endurance and range, and was not very fine-tuned. As an example, our fuel quantity measurement methods were quite simple, and somewhat effective, being conducted by a sailor from the engineering department. The "Oil King" wielded a wooden pole with oil tank level indicators etched on it to dip into each fuel tank prior to and after each underway refueling. Entering the results on a clipboard, the



engineering and supply officers then calculated the amount of "gas we had passed" to the receiving ship and charged them accordingly. While the fuel management system worked, I couldn't help but think that every "mom and pop" gas station across the country had a more accurate way to measure fuel transfers right at the gas pump.

The next "energy sea story" that I related to by now a quite rapt Amory was about my future command, the aircraft carrier USS Ranger, CV-61. An 80,000-ton Forrestal class ship, powered by fossil fuel, I was slated to take command of her in San Diego the very next summer following my time with the Strategic Studies Group. I related to Amory that I had done some research about my future command, especially regarding energy efficiency. On Ranger's previous six-month overseas deployment, including combat operations in the Arabian Gulf, the ship's crew, as required by Naval Regulations, had meticulously maintained navigation logs and supply accounts. After the deployment, someone did the fuel economy math by dividing the total number of miles steamed, precisely documented in official navigation logs, by the much less precise amount of total ship's fuel purchased (refer back to the Oil King's dip stick method of measurement mentioned above). The result: over the course of the six-month deployment, the ship had averaged **a fuel economy of seventeen feet per gallon**. To his everlasting credit and as testimony to his Zen-like serenity, Amory did not faint. But he did have a few questions. . . . I assured Amory that on the next deployment, with good management skill, leadership, and, most importantly, informed and inspired by the great energy work by RMI and Amory, I thought that I would be able to increase the ship's fuel economy to **eighteen or even nineteen feet per gallon!**

Next, I explained that there were some significant underlying factors related to the dismal fuel economy of a conventionally powered aircraft carrier. One was the fact that up on the flight deck, the essential naval aviation mission of the ship used an enormous amount of energy to routinely hurl twenty-five-ton

aircraft into the air with steam catapults in less than several hundred feet. And then at the end of their mission to catch those same aircraft in the landing area with powerful arresting gear, slowing them from more than 130 miles per hour to a complete stop, hopefully, in about 500 feet.

Another key factor in the ship's energy consumption was that an aircraft carrier was a city-at-sea with a crew of more than five thousand people needing essential services—hot showers and cold Kool-Aid—and that meeting those needs constituted a significant "hotel load" on energy consumption. Amory then focused our discussion on how that "hotel load" could be significantly reduced by applying proven methods to ship design like using "short, fat, straight" pipes for engineering system designs. I was keenly interested and thus began a decades-long friendship and partnership to see how we might get the US Navy to become more energy efficient and to increase mission readiness at the same time. Less than ten years later when I was privileged to become the Commander of the US Third Fleet, Amory agreed to lead an effort to analyze ship fuel efficiency and find many ways to improve it. We received funding from the Chief of Naval Research to conduct a detailed study of navy ship operations, maintenance, and design. Amory led a highly talented team of RMI colleagues about an Aegis cruiser, USS Princeton, and as a result, published a ground-breaking report named for the ship. The report detailed ways to improve energy efficiency with better operations and engineering configurations, system improvements that could be installed during regular ship maintenance availabilities, and, importantly, recommendations for future ship designs that continue to positively impact fleet energy efficiency to this day.

Perhaps most importantly, Amory has inspired generations of naval leaders, from the Secretary of the Navy and Chief of Naval Operations, on down to commanding officers, junior officers, and highly skilled technicians. He was a regular, and highly regarded, lecturer at Naval Postgraduate School, the Naval War College, and National Defense University. In all cases, using compelling data and analysis, Amory informed, motivated, and created real change in how military leaders thought about energy. As a direct result of his mentorship and leadership example, our Nation is more secure and prosperous.

Thank you, my good friend, for all that you have paid forward and that you continue to contribute to our society and to our entire planet. While you will always remain forever young to all of us, you epitomize the essence of my favorite Greek proverb:

Continue to plant on, Amory!!

MORGAN D. BAZILIAN, PH.D.

Amory gave me one of my first jobs in the energy sector in the early 1990s. For that, I will always be grateful. Since then, he has always been kind to me, and that is no small thing in our business. I will always think of him as a great scholar and a gentleman. His work changed the way everyone thinks of the energy sector, and it will have a lasting influence.

I remember having Greg Franta tell me a story about a bunch of the leading energy thinkers all sitting around in a hot tub overlooking the Pacific somewhere off Highway 1 in California. As Greg told it, they all thought they were terribly bright and were discussing things of a very intellectual nature. But to Amory, it all sounded like cows mooing. That is, he had thought about those ideas many years ago, and was on to something else. But instead of mocking them or looking down on their ideas, he began to speak to them in their language (of moos).

I hope I can see him again in his banana fields in Old Snowmass.

Thank you.

Warm regards,

Morgan

_____

Morgan D. Bazilian, Ph.D.

Director, Payne Institute

Professor of Public Policy

AMORY LOVINS:

By Jonathan F.P. Rose

Andy Tobias, who attended Harvard with Amory Lovins, describes Amory's academic career as follows: Amory attended Harvard, but was much more brilliant than his classmates, and, bored, he left and attended Oxford, where again he was so brilliant that he was bored (as well as far ahead of his time) and again dropped out. His most consistent job, at the time, was as a mountain guide.

In the summer of 1975, in the Bay Area, I first heard of Amory, when I began to work with Friends of the Earth and radio station KPFA to develop an environmental news radio program. David Brower, the founder of Friends of the Earth, and his team were bubbling with excitement about the thinking on energy policy that Amory was doing in their London office, and the ideas of what would become Amory's 1976 article: "Energy Strategy: The Road Not Taken?" I had really not thought about energy policy in a holistic way until then. Amory's thinking was vastly integrative, ahead of its time, and laid out a sane path that the world should have adopted. We would be safer, cleaner, and more productive if we had.

Although we had several friends in common, I don't think I actually met Amory until 1987, when I joined the Social Venture Network, and Amory came with his travelling kit of energy efficient light bulbs and other paraphernalia. By then, I had read *Soft Energy Paths* and his energy papers with Friends of the Earth, and was deeply impressed with Amory's thinking. His emphasis on negawatts as a key part of the environmental and energy solution was so clear that it became a fundamental element of my work.

In 1991, I hired Rocky Mountain Institute to provide a green plan for the renovation of the Denver Dry Goods Building, a major redevelopment in downtown Denver that my recently formed firm was leading. To give

a perspective on the degree to which green building was then considered to be "fringe," the Denver Urban Renewal Authority refused to pay for RMI's bill, saying that a green plan was an indulgence. I paid for it myself. The subsequent greenness of the building was widely featured, including by winning the one of the AIA's first round of environmental COTE awards.

Amory and I got to know each other better, when, in the mid 1990s, my wife Diana and I bought at piece of land at the end of Capital Creek Road. Amory lives in a house at the base of the road. In our early days, we used to camp in teepees, and Amory and his green building team would come visit us for dinners cooked over a campfire.

One cold, rainy mountain summer night, as we huddled inside a teepee, Amory warmed us up with his latest idea, a Hypercar, and the hybrid cars that would provide the transition. His vision of the logical transformation of the fossil fuel-powered automobile and trucking industries was stunning. When I got back to New York, I wrote the automobile editor of Forbes magazine to try to get him to write about this brilliant new idea. He wrote me back that Americans will always want cars that are bigger and more powerful, and that there will never, ever be a market for lighter, electric powered vehicles, much less for a hybrid car transition.

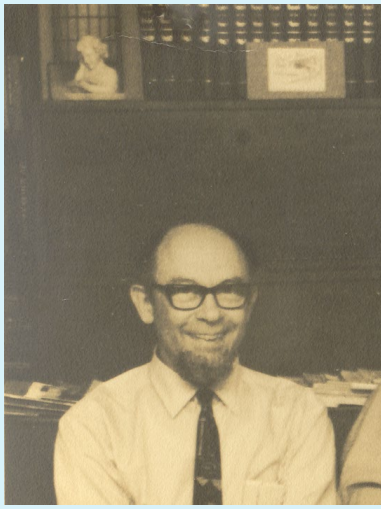
I take great pleasure in knowing that Amory is almost always right!

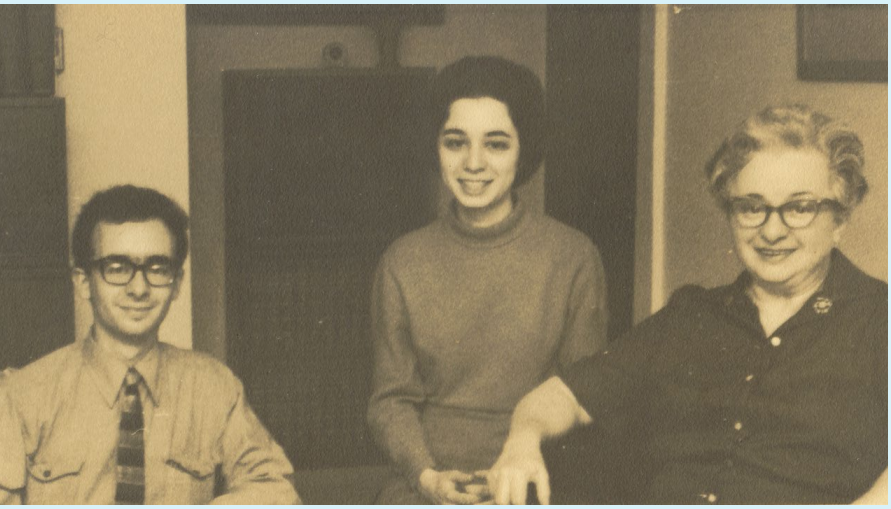
Jonathan F.P. Rose
October 6, 2019
Garrison, New York

I AM A GREAT ADMIRER

Amory is a wonderful man. He was fighting for climate change before so many of us now working hard to stop global warming were ever aware there was a problem. He is a tireless intellectual in the field, and I am a great admirer.

Julian Robertson





AMORY AND THE ORANGUTANS

By Willie Smits

Orangutans, that's right. I met Amory because we both love orangutans. Amory likes to refer to himself as a "born again Bornean" and specifically the cheekpadders amongst the orangutans. In his house, he and Judy have a huge number of stuffed orangutans and lots of pictures of the many orangutans he has visited in zoos and rescue centres around the world. And for many years, he has come back to Indonesia to visit some of my orangutan projects in Kalimantan, Java, and Sulawesi. There are still two more newer orangutan projects to visit, including a new very special project with only giant male orangutans that look deep in your soul with their little eyes, just like Amory does.

I am not good with dates, but I can remember how in the nineties the sun shone through the glass roof of the banana farm when I first met Amory in his house in Snowmass, where I visited him many times over the years since then. He was completely absorbed in a document in which he was writing notes in the tiniest handwriting I had known till then, while someone sat opposite him at the wooden table. When Amory takes of his glasses, his eyes can deal with the tiniest, inhumanely small details! At another table, Hunter was sitting talking to another person. Wayne Sowards of Shell, who was chairman of

BOS-USA at the time (the sister organization of the Borneo Orangutan Survival Foundation that I founded), and I were greeted briefly by Amory after which he immediately immersed himself again in the document he was working on.

About 20 minutes later, Amory stood up and apologized for being busy. When he heard that I was an orangutan-guy though, his eyes immediately started twinkling, and his eyebrows raised a disproportionally large distance upward! This was the start of a very dear friendship for me that did not just involve orangutans but also involved a variety of issues related to alternative energy, especially biomass and growing plants.

What impressed me most about Amory? How many pages am I allowed to write? ;-) In one word, he is amazing. The combination of talents range from his piano playing, speaking German, and reading people, as well as connecting to the souls of our orangutan friends. Oh, and his memory is kind of special too, as well as his incredible speed. When I am still uttering a sentence, he sometimes has already sent me the internet link of an article that answers my question or addresses the subject. He really seems capable of doing two things at the same time. He looks at the screen, and his fingers rattle the keyboard while still absorbing everything else that is going on around him. And let's not forget those strong fingers that seem to have a map of the neck muscles in them, massaging in a way that gives you the most pleasant goose skin you can experience.

Amory is also incredibly empathic and loyal. He cares for people who care. And he has helped me personally, not just with professional contacts and introductions to otherwise difficult-to-reach persons, but also in times when I faced personal challenges. He and Judy have been true friends for me and my wife, Adrienne, and they let us stay in their home many times.

As in the field of the energy transition, I hope that Rocky Mountain Institute will be able to help Indonesia, especially after our recent joint meeting with the Minister for National Planning in Jakarta. Amory is able to quickly grasp the intentions of people of many cultures, and his clever ways of coming with fitting facts and figures for whatever subject of discussion in the energy field opens doors around the world.

For me personally, he is a soulmate, a true friend who was always there when I needed him, and I hope to take him and Judy on still many an adventure here in Indonesia.

Willie Smits

FROM JIMMY MILLS

RMI supporter and former Chairman, RMI Board of Trustees

Dear Amory,

Dearest and Best Amory. Blessed Amory. Wonderful, Marvelous, Who Would Ever Believe It? Amory.

That's for openers, and I could fill in the blanks in a thousand different, heartfelt ways, as I have so often in my thoughts over the years I have shared with you.

Recognizing that, despite substantial evidence to the contrary, I am probably not immortal, it seems appropriate to share a few of those thoughts with you while I'm still around and able to remember them. Even now, it's probably best to summarize rather than to search for details, however unforgettable they may have been.

Mainly I want this message to be viewed as a best effort to do the impossible—that is, to adequately thank you for the ways in which your presence has shaped my life and Helen's, and now three generations of our descendants, each of whose lives has been materially influenced, often quite directly, by the way you have chosen to live yours.

So, on behalf of us all, let me thank you as best I know how (which is to employ your own language) for your guidance toward lives as free as possible from the threat of privation or assault, while earnestly striving to create lives of abundance for all forever.

Love.

Jimmy

PS: Amory's phone call inviting me to become a Director of the then-infant RMI altered my life profoundly, and continues to affect the lives of my children and theirs. The most recent (and noteworthy) is Jim Jr.'s invitation to the Carter Center's Board of Councilors. To me, there is a direct causal connection.

A WORLD OF REASONS TO BE GRATEFUL

By Sue Woolsey

Like everybody who knows Amory, my memory is full of images and anecdotes—amazing Amory stories. And pithy quotes that have made me stop and reflect over the years. And inspiring one-liners that keep me moving and hopeful. And the "Applied Hope" speech on my desk as a reminder.

The challenge of trying to write a pithy, hopefully inspiring story that reflects his impact on me—and the rest of us—is that he long ago cornered the market on pith, inspiration, and anecdote. Amory has been deep, thoughtful, and edgy for the entire 40 years that I have known him. And I didn't meet him until he was 35.

Amory merges rhetoric with pragmatism. He makes it seem effortless to pursue a logical, evidence-based course with ideological agnosticism. I envision him summiting conceptual, political, and technical (as well as actual) mountain ranges, cheerfully treading narrow trails with thousand-foot drops on both sides, logically analyzing the "easy" and "obvious" routes to safety. No ideology needed: just total clarity and creative ideas born of the determination to broaden his focus. And of course, his unique capacities, which he is confident all of us can share, if we would just pay attention.

I join Amory's legions of friends and admirers to salute him and his innumerable accomplishments. I also salute and treasure the personal Amory—the friend who never ignores an email, who is the ultimate connector, and who constantly puts people in touch with those they need to know in order to extend and strengthen the web of positive energies and good hard work that he spins in this world. This planet, and all of humankind (but especially those of us lucky enough to know him), have a world of reasons to be grateful.

Thank you, Amory!

Sue Woolsey

AMORY LOVINS

By Mark Moody-Stuart

In the more than two decades that we have known each other, I have always been greatly impressed by Amory's imagination and creativity in many fields. I have frequently been almost overcome by the barrage of statistics in multiple units that Amory often uses to back up his arguments.

In the nineties, we were fortunate in Shell to be able to tap into Amory's advice on energy efficiency, apart from his contributions to scenario development. Energy efficiency is of course core to the business of a company like Shell, and Amory could always grab the attention of engineers with his tales of lateral and original thinking. Many of these came from Amory's experience with the military, occasionally a source of slight concern to some of his colleagues. I recall him pointing out that if military capability was required, we should at least make sure that it was highly energy efficient, calculating that the delivered cost of a gallon of gasoline to the frontline was astronomical. In a natural gas liquefaction plant, every degree of ambient air temperature makes a difference to the overall efficiency of the plant. I recall Amory calculating the impact on overall ambient temperature of painting all the roads in a plant white. By such examples, which illustrated the cumulative effect of small steps on overall efficiency, creativity was stimulated.

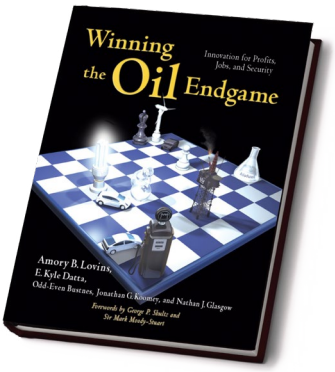
One of Amory's projects was the Hypercar, a lightweight fuel cell hybrid vehicle. In the late nineties, Shell was also working on an onboard reformer that could produce a hydrogen rich fuel from gasoline, which would power a fuel cell in a hybrid vehicle where the fuel cell could also be directly fuelled. The gasoline reforming unit would compensate for the likely paucity of available fuelling points for the fuel cell. This concept never caught on with the motor manufacturers.

I was personally a small investor in the Hypercar and always said to Amory that a driveable concept vehicle that journalists could directly experience would have the greatest impact. Amory, perhaps rightly, thought that the focus should be on industrialising the process of production of the lightweight bodies, and this became the focus of the eventual venture. Others are now pursuing this light-weighting process that is essential for efficient transport.

The Hypercar and its fuel cell certainly influenced my own thinking on hydrogen. Shell, in the late nineties, formed a hydrogen business that, like the Hypercar, was before its time. Amory is also a pioneer in the process of developing strategies for the critical energy transition through which we are all living now. His 2005 book, *Winning the Oil Endgame: Innovation for Profit, Jobs, and Security,* is perhaps even more relevant to the needs of today, and I was honoured to be asked to join George Shultz in writing a foreword. By postponing decisions on efficiency, transition paths, and necessary steps, such as establishing a price for carbon emissions high enough to influence policy and drive change, we have made, and are still making, it harder to achieve the transition at the speed and extent that we need. As an enthusiast for hydrogen as one element of that transition, I find it satisfying to see that versatile substance edging its way into mainstream thinking on storage, heavy transportation, and those industrial processes that are difficult to electrify.

The thread of Amory's work has always been creative lateral thinking. This was evidenced in the original concept of Rocky Mountain Institute, a building several thousand feet up in the Rockies, energy self-sufficient through photovoltaic and passive solar, with bananas growing in the atrium. I recall sitting with my wife at our table in London while Amory showed us his design for a new home for bonobo apes. Amory was delighted, and we were amazed that communication had involved consultation with the bonobos. Unsurprisingly, client wishes included bananas, and these were indeed to be provided in an energy self-sufficient way. It is good to know that Amory's wisdom, advice, and boundless enthusiasm will be available to Rocky Mountain Institute and the world, hopefully for many years to come.

Mark Moody-Stuart



FESTSCHRIFT FOR AMORY

Gil Friend

How did you first meet Amory?
I first encountered Amory when I read "Energy Strategy: The Road Not Taken?" in late 1976. I had just left the Institute for Local Self-Reliance to do a graduate degree on the left coast. But I don't think we physically met until I was ensconced in Jerry Brown's Office of Appropriate Technology and hosted Amory in the California Governor's office (probably in 1979) to lay out the soft path to state leadership.

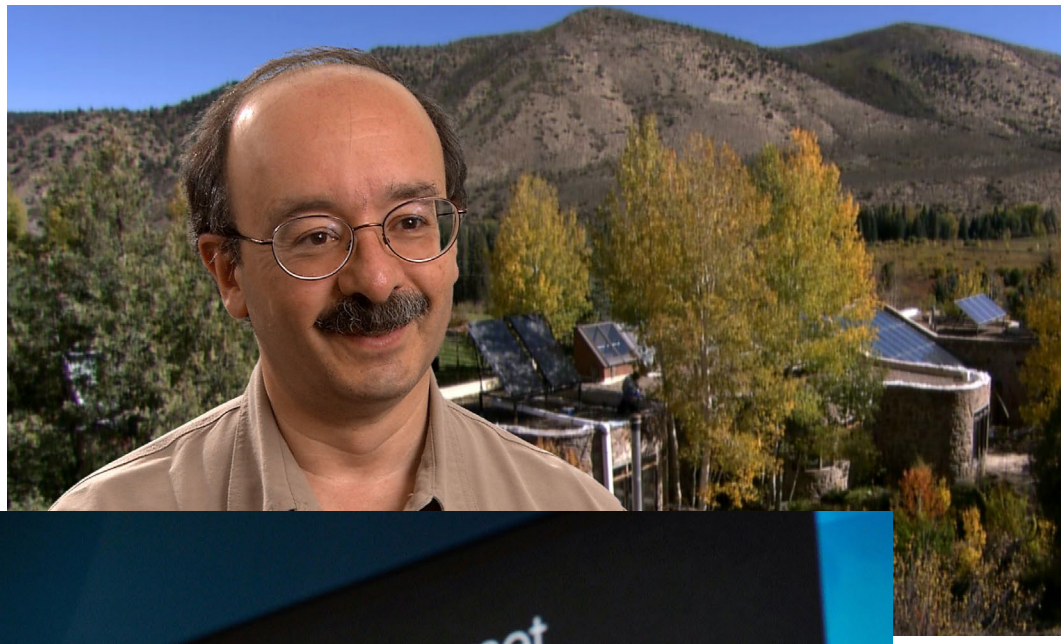
What impresses you the most about Amory and his life's work?
You mean aside from his thumbs? And the mischievous gleam in his eye? And his ability to respond to an audience question by pulling exactly the right transparency (remember those?) from the midst of a two foot-high stack?

I'd say it's this: his consistent ability to see the whole, with all its interconnections, interdependencies, and opportunities; disclose the logic in clear, irrefutable ways; illustrate examples simply and engagingly; and delight and entertain at every turn, never at a loss for the perfect witty epigram.

How has Amory influenced your life or thinking about the energy transition?
There are so many things to choose from, more disciplines of mind than specific stories, but "tunneling through the cost barrier" shows up again and again, as both a reminder of how to think and a lockpick to unlock all the "but…"s of habitual resistance.

Any other thoughts about Amory?
When John Lanier asked me a few months ago "how are you doing?" I surprised myself with the answer: "You know, I never expected 20 years ago that we would be as far along as we are today. And I never expected 20 years ago that we would be in as much of a mess as we are today." I consider Amory one of the most significant contributors to that progress, and to getting us out of these messes, and I'm grateful beyond words.

Happy birthday, my friend!




Renewable Energy's Costs Continue to Plummet
Photovoltaic modules
Windfarms

TO AMORY

Mr. Dai Yande

Many congratulations, Amory. According to my own experience, I am sure you will be busier than before, and it is a good thing that you can focus more on thinking and writing because after so many years of pleasant working experience with you, I still feel that your thought leadership is like a huge coal mine, capable of inspiring every miner. Reinventing Fire is still a solid thought leadership in China, indicating a bright and reliable green development way for China. Your recent thoughts on how big the energy efficiency could be is such an attractive topic in China, and people wish to learn more and to really work to dig into the potential. This means a great deal to China when it is turning its development model from high speed into high quality.

Mr. Dai Yande

Former Director of the Energy Research Institute of China's National Development and Reform Commission

A BLAST OF OPTIMISM

Adam Albright

I met Amory when he dropped in to visit us in our home in the Berkshires one day back in the 90s, like an EcoMale Mary Poppins. Running an environmental organization is never easy, and those of us who were paying attention to the state of the world even in those halcyon days were prone to times of depression and weariness, so working with Amory was like a blast of optimism and a fresh view of what's possible. It's not that Amory is without his blind spots and fallibilities; in fact, he may have more than most of us. It's just that they never really slow him down. "This project didn't quite work, but we learned from it, so let's tee up the next one." When I was on the RMI board, there were many of what I like to think of as "growth opportunities." There were the usual financial challenges to be sure, but mostly some very sticky personnel issues. The great thing about Amory is that he trusted us, let us do our job, and supported the process as we worked our way through them. It goes without saying that Amory represents not only the brainy parts of RMI but the heart as well. He makes it easy to admire and believe in him, and I am honored to have been part of it all.

Salut and respect, Amory!

Adam Albright

AMORY LOVINS "FESTSCHRIFT"

Peter Boyer

I first met Amory Lovins in the early 1990s and had the experience I have come to learn is not uncommon: "Wow, I think I just heard something really important, and…different, and, I think, well, important!"

Amory had made a luncheon presentation at the Commonwealth Club in San Francisco. I decided to attend after reading the blurb about him in the schedule of upcoming events in which he was quoted as saying (I paraphrase): "Global warming is a problem we do not need to have and cannot afford to have. Effective, affordable, and safe solutions already exist to prevent its worst effects. My only concern is with economists who lie awake at night wondering if what already works in practice can possibly work in theory." I decided I just had to see this guy!

As you will hear from many people, that first exposure to Amory and his hopeful, witty, profound, and original message, changed my life on the spot. He talked about the power of a single (then new-fangled) compact fluorescent light bulb that, if used for its expected life, could save the emissions of a barrel of oil used to generate electricity. One bulb! He went on to describe the new cars headed our way, hybrids, and EVs, and perhaps hydrogen-powered urban assault vehicles. This was 1992, and by 2005, I was, indeed, driving a Prius. Now I drive a Tesla.

But, then as now, Amory did not just roll out wonky statistics and dry data (although, god knows he has plenty of those). No, his delivery was energetic, even vivacious, and very, very witty. You had to be quick to catch all of that wit, as Amory is as efficient with language as he urges the world to be with energy. I left his talk inspired, intrigued, a bit mystified, and eager to find a way to lend a hand to this effort. Per his suggestion, I stopped at the PG&E "Energy Demonstration Center" and learned what solutions were already underway.

From that first encounter, I have gone on to read all the books and papers I can from him and the rest of Rocky Mountain Institute's team. I had already been alerted to the "Climate Problem" in the late 1980s following the publication of Steven Schneider's "Global Warming." It was clear there was much to do, and little time in which to do it. Amory alerted me to the enormous **promise and opportunity** inherent in meeting the challenge.

A while later, I made a small donation to RMI, and was contacted almost immediately by Marty Pickett. We met, and I began my closer involvement with the RMI family. Shortly after that, we hosted a salon at our home with Amory. I found out how easy it is to fill a room by simply making it known that Amory Lovins would appear. It was standing room only.

Since that first meeting with him in person, we have become colleagues, co-workers, confidants, and, most importantly, friends. I joined the board in 2008, and look forward to continuing that engagement with Amory and RMI.

Finally, I think it important to note that Amory's giant intellect comes wrapped in a wonderful human being. His eyes twinkle often, especially when he is poking fun at the "tyranny of conventional thinking." His effect upon the world and on those of us lucky enough to know him goes far beyond the "data" of his energy message. Otherwise, why would my soul feel so warmed in his presence? Thank you, Amory. Onward, through the fog!

Love,
Peter

TRIBUTE TO AMORY LOVINS

Anand G Mahindra, October 2019

I first had the pleasure of meeting and hearing Amory Lovins at Davos. I still recall him at Davos in my mind's eye, accompanied by Mrs. Lovins, carrying a bag full of samples of auto parts made from carbon-fiber composites everywhere, to demonstrate how auto companies can lightweight their vehicles. What impressed me at that first meeting was his bubbling enthusiasm, the depth of his scientific knowledge, and his generosity in sharing his ideas. Here was a man who was clearly ahead of the curve and immensely invested in finding practical solutions to pressing global problems.

Since that first meeting, I have met with Amory several times, and invariably emerged from such meetings energized and fascinated by his take on major issues. He has worked with the Indian Government and many Indian corporates including some of our businesses, and he has always had a major impact on the way we think and act.

What I find fascinating about Amory's work is the way he approaches issues from an angle that is almost counterintuitive. When the auto world was talking of designing fuel-efficient engines, Amory was focusing on making materials lighter. When the spotlight of publicity is on renewables, Amory is making a very persuasive case for how smarter design can better apply existing technologies to create radical energy efficiency at far lower cost. Thinking differently is his forte and he prods us to think differently as well.

It's hard for me to imagine that Amory will ever retire in any real sense of the word. I am sure he will continue to innovate and evangelize and shake up the way we look at the world. My very best wishes are with him.

Anand G Mahindra.
Chairman, Mahindra Group

PRACTICAL OUTCOMES WITH RADICAL THINKING

Richard Branson, Jean Oelwang, & the Unite team

Dear Amory,

We will never forget hearing you speak for the first time—an amazing combination of wisdom, optimism, and "applied hope." We are so thankful for the extraordinary vision you had long before the world caught up, about the importance of an energy and efficiency transformation.

Along this journey, you've wisely balanced practical outcomes with radical thinking and lived a life of deep authenticity. (One day, we will get Richard to your indoor banana farm and net-zero home!) We feel so fortunate to have had the chance to work with you to spark the unlikely marriage of RMI and CWR, creating a formidable force for good, fueled by the best scientific and entrepreneurial energy. The success of this merger is a testimony to your deep belief in possibility, collaboration, and a mission that is way bigger than all of us.

Another beautiful "Amory moment" was on Necker, when you and Judy renewed your wedding vows—of course, along with your orangutan mates on your shirts. Your love for Judy and the sheer joy you both have for life are bright beacons to all of us.

The work you started all those years ago when you founded RMI is now more important than ever before. Your legacy will live on in the work you continue to do—and, as importantly, in the many lives you've inspired to look at the world through Mother Nature's lens.

Thanks for dedicating your life to staying below 1.5 degrees. You will always be a hero of ours.

With the greatest respect and gratitude,
Richard Branson, Jean Oelwang, & the Unite team

DEAR AMORY,

Maria van der Hoeven, Maastricht, 14 October 2019.

The first time we met was quite some years ago. In those days, I was Executive Director of the International Energy Agency (IEA), and you already had a well-established name and reputation in the field of energy transition and renewable energy. RMI, the think-and-do-tank you founded, was gaining influence and importance.

You gave me a present: *Reinventing Fire,* a wonderful book which changed my mind in looking at a number of things. Although I do not share your opinion on the speed of the transition, there are many other things I do share. Your book made me think about my own work and the future of energy from a different perspective. You might say that it led to the annual IEA Market Report on Renewables, which I established.

Some say the IEA figures on renewables are too conservative, but nevertheless, it was and is absolutely necessary that an organization like the IEA (and its members) is aware of the energy transformation and the role of renewables in that respect.

A few days ago I had another look at *Reinventing Fire* and I was struck not only by what you wrote in those days, but even more at what had materialized already. You have a real forward-looking and prophetic mind! A mind that also led to the realization of the Innovation Centre, RMI's state-of-the-art, beyond net-zero energy office and convening centre in Basalt.

I sincerely admire your drive, passion, and ambition to continue and further develop your own pathway. Your mind is constantly innovating, and thanks to you and RMI, many changes have been set in motion all over the world, notably in island countries and countries like China, India, and Rwanda to mention just a few. Your vision and your fabulous ability to attract so many people willing to fund RMI and its work, but also to attract the right collaborators, has been crucial. Furthermore, many would like to have your diplomatic skills!

Dear Amory, I am honored and proud that as a Member of the Board of Trustees I had the opportunity to work with you in the past four years. It was an enrichment. I really hope and wish that RMI will benefit for many more years from your innovation and think power. It will guarantee that RMI can continue to be an instrument of change.

Thank you very much for all you did, and all the best for the future. Especially longevity in good health!

Maria van der Hoeven
Member Board of Trustees RM

JUST DO IT

Sue Rumbaugh, October 2019

I first met Amory in the '90s when radio show host Paula Gordon brought him to visit our bonobo language project in Atlanta, Georgia. Paula had made close friends with one of the bonobos named Panbanisha. Paula and Panbanisha (an adult by then) loved sitting together on the couch in our home and enjoyed watching soap operas. The bonobos liked Amory immediately, and he seemed to understand them with equal alacrity. This was most unusual. He spoke to them directly as though they understood—which they appreciated deeply because they did understand, and very few strangers ever gave them such credit or behaved in such a respectful manner toward them. Most strangers approached with the idea that the bonobos needed to "prove to them" that they understood language before they would give them the benefit of the doubt. The bonobos did not have much patience with such persons. But Amory's interactions with them were quick, natural, appropriate, and, in a way, avant-garde. He sized them up rapidly—I don't exactly know how, but he seemed to have a natural ability to be honest, open, and professional with whomever he was speaking, and the bonobos were not "excepted" just because they were "nonhuman."

We stayed in touch, and when a green design was needed for a new bonobo facility going up in Iowa in early 2000, Amory volunteered to help us out. He visited and then attended a planning meeting, where—in no uncertain terms—he made it clear that the building was being constructed in a flood plain and that it should be relocated. We knew it was near the Des Moines River, but there was an earthen dike between the proposed site and the river, and we had been told that it would not flood. Amory took one look at the plans and the elevations and very clearly, but quietly, calmly, and sweetly—as he always is—indicated that the architects had made a mistake. The architects assured everyone that they had planned for flooding and all was being taking care of. Amory stood his ground. So did the architects, and the bonobos (and I) were left quite in the middle not knowing what to do. Mr. Townsend, the donor, went with the architects, and soon, for reasons not clear, the lead architect resigned and the building was "redesigned" by a computer program.

It turned out the "preparation" was not to avoid a flood, but rather to redesign the building to withstand a flood. And four years after

relocating, flood it did. Five feet of water with a strong current came inside the building so fast that there was no way to get the bonobos out. Two weeks were spent inside the building with the bonobos in five feet of water and mud. The building and the bonobos were accessible only by motorboat. We had to pass food through the small windows and live in chest high waders. Later we learned that the Corps of Engineers had not given a building permit because they, like Amory, said the building would flood. How the building got built remains a mystery. But Amory—as always in my experience—was correct. In the wake of the flood, the donor resigned from the project leaving it in the lurch. Needless to say, given such an experience—I never ignore Amory's advice! Amory—for all those who know him—is a happy fun-filled genius. He also never stops thinking about how to do things better, whether it is as simple as eliminating needless bends in a plumbing job, or figuring out the correct way to add Homo sapiens and the planet's natural resources into the calculations of the costs to produce things—so that we don't focus on just "things" and end up losing the resources (human, mineral, and forest) that allow the things to be produced. It seems that only now is this message actually reaching consciousness at a planetary level—thanks to Amory's calm and steady persistence in presenting both the problem and a plan to resolve the problem.

Can someone please make sure that each of the presidential candidates reads *Natural Capitalism* and *Reinventing Fire*—or at least owns a copy? Or will Amory please step in and run for president? I will make the first donation to his campaign. Even if he loses, which he just might not, the world will be educated on the things it needs to understand now!

Amory has been explaining how to solve the problems facing our current civilization to companies around the world in plain, clear, friendly terms for longer than anyone else, and through RMI, he has generated the facts to back both his analyses and his projections. He has done this tirelessly, around the world with good humor—and still found time to discuss bonobos and the language abilities he saw in Kanzi and family during his visits.

Since reading *Natural Capitalism*, I have often wondered, why is it that Amory's more-than-obvious solutions are not adopted out of hand? Why does Amory have to travel around the world constantly explaining economics to the human race?

Of course, on the one hand, I know the answer because I study culture and behavior, and I know how prone people are to simply do what they did before, or to think what they thought before. Change seems "scary," but the calculus is self-evident to anyone who does not wish to put their head in the sand. The alternative or failing to replace fossil fuels and heavy wasteful industrialization techniques is not only scary, it is certain collapse of the entire infrastructure on which the fossil fuel industry rides.

I also know that change can take place if even one person commits to it absolutely, fully, and without any doubt as Amory has done. But now, more

than ever before we must ask these questions:

1. Why has human culture made continual advances since the onset of the Renaissance in improving material life, but failed to change any of the basic human problems of jealousy, greed, selfishness, anger, aggression, deceit, war, patriotism without purity of motive, and the other ills that have beset us since at least the dawn of writing, and who knows how long before?

2. Why have we Homo sapiens succeeded beyond all imagination in industry and technology, while failing to make equal progress in becoming other-centered, selfless, kind, gentle, and constructively and constantly encouraging to all we encounter? Are psychologists, sociologists, and anthropologists simply wasting their time, or is "human nature" immutable? Are we bound to recreate our human problems anew each generation while we solve all of the energy and resource problems?

There is a living ape species that has solved the many social problems of being "Homo"—a species that is self-aware, is self-reflective, is able to plan ahead, possesses complex language,

and creates music and fire. That species, the bonobo, structures its society around forgiveness and heart love. This is something that bonobo children are taught very early (before they can speak) and with great deliberateness and care. This teaching goes with an insistence on lack of deceit and an insistence on sharing everything. Bonobos are the most peaceful apes on the planet bar none (and humans are apes as well). Bonobos live in groups of up to 100, and when they join with other bonobo groups forming aggregations of up to 400, they have a Festschrift of sorts—most certainly a party. And their moto seems to be, I never met a bonobo I didn't like! Like us, they have their fair share of showing off their physical prowess, they can get their feelings hurt, and they can punish, if necessary. But they prefer not to hold grudges. These wonderful traits can, however, be overridden by cultural breakdowns due to hunting or importation to zoos, resource stress, etc. Indeed, they may not even be characteristic of all bonobos in the wild, as only a few groups have been observed, because it is a very difficult to follow them in the high dense rainforest.

Although orangutans are, understandably, Amory's first love among the apes—he has never failed to understand and to firmly support the cultural linguistic work with the bonobos. He is among the few people today who grasp the potential for communication between bonobos who have acquired a human language—and bonobos living in the Congo, who speak bonobish (Amory's term.) His expression of the importance of establishing and understanding the linguistic system of the wild bonobos through an internet connection, is increasingly becoming understood by others.

On October 16, 2019, the Dali Lama tweeted:

"Every morning when I wake up, I dedicate myself to helping others to find peace of mind. Then, when I meet people, I think of them as long-term friends; I don't regard others as strangers."

Certainly, this embodies Amory. He has pointed the way to an economy of the future that, if adopted, would make it possible for the "haves" to help provide for others while not being forced to "do without."

It is time now to "Just do it!"

Sue Rumbaugh

Chair, Bonobo Hope International, nonprofit
Part-time faculty, Missouri State University

DEAR AMORY,

Avery McEvoy ,October 11, 2019

I'm Avery McEvoy. I took the first edition of the "Extreme Energy Efficiency" Stanford/RMI course and was the teaching assistant for the second edition, in March 2019. This was my first exposure to you, RMI, and the next step in my career path. I interned for RMI as a Schneider Fellow in the Islands Energy Program this past summer, identifying critical facilities in Puerto Rico for solar-plus-storage microgrids to increase energy resilience. I was visiting the Basalt office with other Boulder interns when you announced your shifting role at RMI. I now work at Stanford for Jane Woodward, helping teach the "Understanding Energy" course and leading the next iteration of the "E3: Extreme Energy Efficiency" course with you and RMI.

The work you've done, creating such a cutting-edge, innovative, energetic, intelligent entity that's working to create a cleaner energy landscape for a better world, has been extremely impactful. I want to emphasize, as someone in the millennial generation, how much you have inspired me. Your thought leadership has been pushing boundaries for decades. Now that the general public is finally starting to understand that climate change is underway and already having real effects on the lives of many, it's clear that RMI has emerged as a leader in generating solutions to these planet-scale problems. Being in the early stages of my career, it is a wonderful feeling to have found a company where the tough questions are being asked, the analyses are being crunched, and innovation is being championed.

I cannot underscore enough just how much meeting you and being introduced to RMI changed my life. I finally feel like I found a place where I fit in—and not just because people keep mistakenly calling me Amory because of how similar our names are! You've been a common theme that's come up in even some of the most remote places in the world—for example, when I met Sandy and Anne Apgar on a National Geographic ship in Greenland in the summer of 2018, or when I met Steve Wiel on a safari in Namibia last April. They had nothing but wonderful things to say about you and were delighted to hear about my connection to you through the class and my internship.

Here's to you, Amory! You are the spirit of RMI. And although your title may be changing, I look forward to seeing your legacy carried on through the Emerging Solutions team and seeing how your thought leadership will continue to flourish in this new role.

Warm regards,

Avery McEvoy


18x
OPTICAL ZOOM

A CONTRIBUTION TO THE AMORY B. LOVINS FESTSCHRIFT

by Jonathan Koomey, Ph.D.
October 15, 2019

I first encountered Amory's work as a high school student in the late 1970s, when I became intensely interested in all things energy. I could tell even at that time that something wasn't right about the conventional wisdom, and Amory's book *Soft Energy Paths*[1] showed me I was on to something.

I read the book then, but can't say I understood it all at the time. Amory showed that there was a way to look at the energy problem that was analytically rigorous, but that led to a very different future than the one envisioned by the energy industry. His work was also a window into the thinking of brilliant people like E.F. Schumacher, Kenneth Boulding, Buckminster Fuller, and others, and their insights were a revelation to me.

When I went to Harvard in 1980, I found my way to the History of Science department, where I could study physics, engineering, history, and economics. I knew understanding of these disciplines would help me disentangle the complexity of the energy problem.

My senior thesis was on changing attitudes towards energy conservation in the 1970s, which at that point was barely history, but they let me do it, and for that flexibility I'm thankful. When writing the thesis, I read the entirety of the congressional testimony Amory and others gave about *Soft Energy Paths*, and I'm certain only a tiny handful of others can make that claim. I used Amory's book as the centerpiece of my historical analysis and narrative, which worked well.

After college I headed to the Energy and Resources Group at UC Berkeley, where I became one of the late Art Rosenfeld's graduate students. My 1990 Ph.D. thesis, focusing on market failures in new commercial office buildings, caught Amory's attention because he was working then on his famous report on institutional failures and energy efficiency.[2] After meeting at one of the ACEEE Summer Study conferences at Asilomar in the early 1990s, we struck up a friendship and intellectual collaboration that continues to this day.

Around the year 2000, Amory, Joe Romm, and I confronted fabricated "factoids" on electricity used by computing equipment created by Mark Mills and Peter Huber. We worked as an informal team to debunk these fabrications in the media and peer-reviewed literature, and grew to respect each other's strengths as part of that process.

By the early 2000s, I had grown tired of leading a group at Lawrence Berkeley National Laboratory (bureaucracy was not my friend) so I handed off my group to a colleague and went to Stanford for a year as the second of five MAP/Ming visiting professors. Joel Swisher, who worked at RMI for years, was the first MAP/Ming professor. A few years later, Amory became the fifth one.

Amory reached out to me in late 2002 to collaborate on the RMI study that would become *Winning the Oil Endgame*.[3] I had been at the analytical heart of four large-scale energy/climate policy studies since the late 1980s, and Amory wanted to bring analysis of similar detail to bear on the oil problem. He knew I could help the team with analytical rigor and careful use of energy statistics.

I spent a month at RMI working on *Oil Endgame*, which was a productive time with long hours (and eating a lamb shank cooked in a toaster oven—ask him about that). I also vividly recall borrowing Amory's first generation Honda Insight with his firm reminder as he handed me the keys that the cumulative miles per gallon must not drop below its then current 62.5 mpg (it didn't).

Part of the rationale for that visit (and a subsequent one, if memory serves) was to explore the idea of me becoming the research director for RMI, with Amory's strong support. It soon become clear that RMI really needed a consulting director, not a research director, and that smelled too much like bureacracy to me, so I moved on.

Amory and I later collaborated on public debates about the rebound effect, in opposition to some wrongheaded but well publicized analysis by folks at the Breakthrough Institute. That experience cemented our collegial bond.

Amory's always a few decades ahead of the conventional wisdom on energy issues. We've occasionally disagreed about small things, but I look to him for big picture perspective when I'm not sure which direction to take. He's always given me unflagging support and encouragement, and for that I'm eternally grateful.

Congratulations on your transition to free radical, my friend. I look forward to seeing what the next chapter brings for you and for our continued collaborations.

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[1] Lovins, Amory B. 1979. *Soft Energy Paths: Toward a Durable Peace*. New York, NY: Harper Colophon Books.

[2] Lovins, Amory B. 1992. *Energy-Efficient Buildings: Institutional Barriers and Opportunities*. E-Source/RMI. Strategic Issues Paper. December. http://www.rmi.org/rmi/Library/1992-02_EnergyEfficientBuildingsBarriersOpportunities

[3] Lovins, Amory B., E. Kyle Datta, Odd-Even Bustnes, Jonathan G. Koomey, and Nathan J. Glasgow. 2004. *Winning the Oil Endgame: Innovation for Profits*, Jobs, and Security. Old Snowmass, Colorado: Rocky Mountain Institute. September. https://www.rmi.org/insights/knowledge-center/winning-oil-endgame/

9/11: A SUSTAINABILITY STORY

Joel Makower, Chairman and Executive Editor, GreenBiz Group

Of all my encounters with Amory over the years—and there have been many—the most vivid recollection took place on September 11, 2001—yes, 9/11. Through a quirk of fate, I found myself marooned for five days with Amory and a remarkable group of fellow travelers. It was, for both obvious and nonobvious reasons, a moment of a lifetime.

Amory and I were part of a small team brought together for a one-day brainstorming session on behalf of the Connecticut Clean Energy Fund, established a year earlier by the state's legislature to invest in clean-energy resources. The stated mission of the exercise was "to map out the investment opportunity space and suggest which areas of opportunity will provide the most fruitful focus in the search for ventures that meet both social and financial criteria."

We had been asked to consider a broad range of investment options, both short-term and longer-term—high-tech bioreactors for farm waste, biomimetic membrane technology, tide and river flow energy, self-assembling solar cells—from the mundane to the exotic.

We began the exercise on the morning of September 11.

It was an extraordinary group, assembled by our friend Gifford Pinchot III, a long-time entrepreneur, author, and conservationist, and later cofounder of the Bainbridge Graduate Institute. Pinchot was the connective tissue among our group of seven, which included biomimicry maven Janine Benyus; Anita Burke, at the time a sustainability executive at Shell International; Joe Romm, a former Energy Department official and the founding editor of the influential blog, ClimateProgress; and Benjamin Brant, an entrepreneur in renewable energy and energy efficiency.

An hour or so into our brainstorm, Arnold Brandyberry, our lead client from the Clean Energy Fund, rushed into the room saying, in effect, "Come into the hallway. You have to see what is happening." We walked a short distance to the lobby, where the TV in the hotel bar had attracted a small crowd.

It was standing there, arms linked, that we watched the towers fall.

Brandyberry and his team had the presence of mind to get us out of the hotel and away from the airport. Romm, the only East Coaster, split off to return to Washington, D.C. The rest of us scrambled into two vehicles and were driven into Connecticut's Farmington Valley, about 15 miles away, to the largely vacant Simsbury Inn—what Benyus quickly dubbed "our five-star bunker"—where we spent the next five days trying to get home to Montana, Colorado, Washington, and California, all too far to drive or bus, or so it seemed at the time.

It was a rare opportunity for this normally peripatetic group of individuals to dial down, spend more time digging deeper into conversations, both personal and professional, than is normally possible. It was an extraordinary experience for several reasons, not the least of which was being stranded with a group of renowned systems thinkers during a time of unprecedented, catastrophic systems failures.

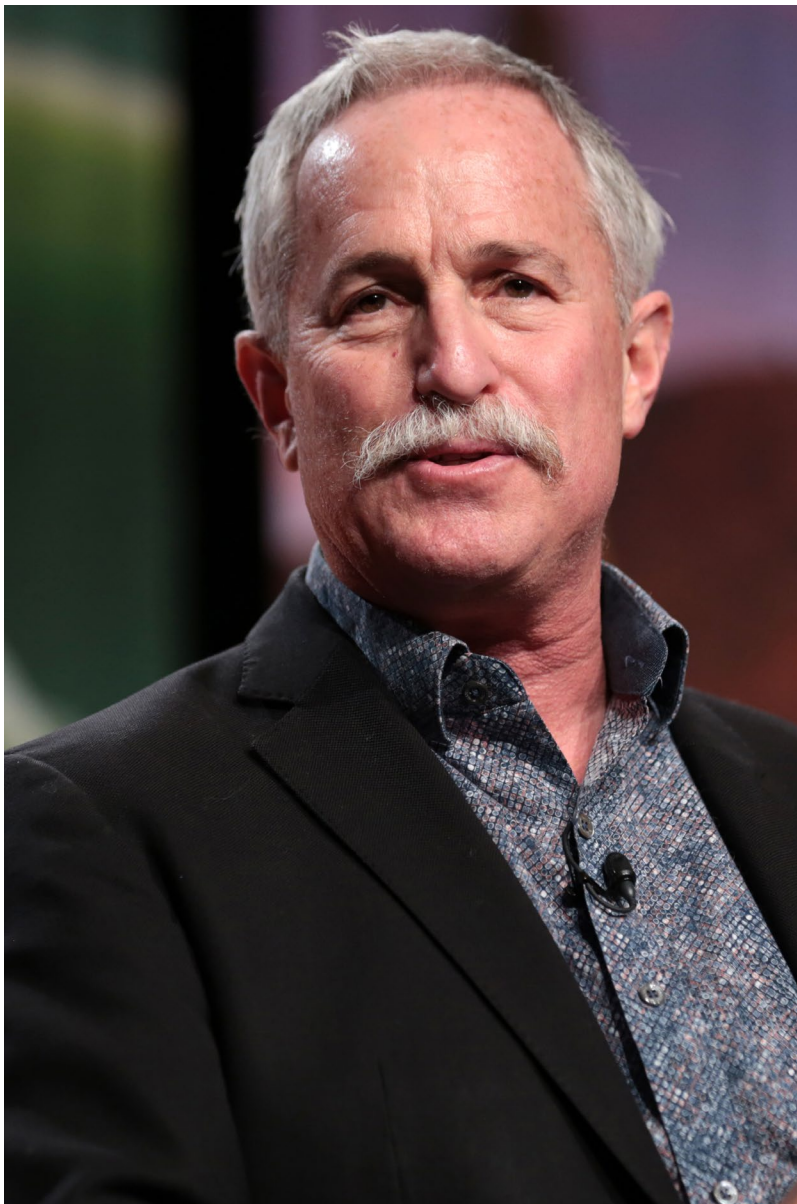
We were, like everyone, in a state of shock, and each of us processed the events in our own way, from the emotional to the introspective. For Amory, ever the scientist, it was the opportunity to ruminate on what likely happened, how it could have been prevented, and how it could have been worse. Within an hour or two, he was calculating damage assessments and what-if scenarios, out loud, in real time. RMI had worked on the greening of both the White House and the Pentagon, so Amory had visibility into the buildings' integrity.

The next morning, he pointed to the sky and noted the lack of condensation trails resulting from the unprecedented shutdown of airline traffic. He saw that moment as a grand experiment in the effect of contrails on temperature. Of course, he was right: contrails trap long-wave radiation escaping the Earth. We later learned that their contribution to global warming was documented during the aviation hiatus that followed 9/11.

But it wasn't just Amory's estimable intellect that shined in those moments. It was also his humanity, his warmth, his bear hugs and back rubs. It was his wit and wisdom, his ability to talk us through tough moments, his deep well of hope and inspiration. They were lifesavers during those challenging days, for which I'll be forever grateful.

I had the chance not long ago to review the final report that Gifford produced as the result of what had inadvertently turned into a five-day brainstorm session. It was full of good ideas, many of which are still relevant today.

The report was a poignant reminder of the challenges still ahead, the lessons still unlearned, and the ideas and opportunities that Amory continues to champion—and whose voice continues to be a beacon of opportunities, common sense, and hope during still-perilous times.



TRIBUTE TO AMORY LOVINS

Jack Wadsworth

Amory and I go way back to the early days when I was introduced to him by David Sellers, who was a member of the Windstar Foundation Board in Aspen. We were connected with many mutual friends through that association. Those friends included, most importantly, Amory but also Mac McQuown with whom I now have many partnerships and a lot of miles logged, and we share a mutual high regard for RMI and Amory's early vision.

My first real encounter with Amory was when he spoke as a keynoter at a conference in San Francisco on climate change. Those were the Gavin Newsom mayor days, and his inspiring remarks created a number of Asia Society initiatives in the sustainable world. It was at that conference where I encountered an Amory Lovinism, which I have quoted on many suitable occasions: In God we trust but everyone else has to bring data.

It was not long after that experience that Amory received an honorary degree from the California College of the Arts where I am a trustee, and he delivered a graduation message that inspired the class of 2014 beyond belief. His inspiration derives from the importance of not taking "No" for an answer and being sure to test the limit of every reasonable opportunity. Amory, of course, has a marvelous way of living out what he believes, and there is no substitute for inspiration being conveyed by example.

Then there was the famous Reinventing Fire journey to China. The first conversation began with one of those conference calls that we are all famous for, but this one was unique. The instigators were Jack Wadsworth and Gary Rieschel, and it took six months to connect the dots. When it finally occurred, Jack was in San Francisco, Amory was in Kyoto, and Gary was in Washington, DC. From this phone call spun an idea that a gathering in Aspen should be organized to facilitate a conversation about applying the Reinventing Fire thesis to Chinese GNP. Again, it took six months for this to happen, and it finally occurred in Amory's living room. As I recall, there were two fundamental questions on the table:

1. Should Rocky Mountain Institute have anything to do with China, and if it should, what would that be? There was more than adequate Taoism-inspired grounding supplied by Amory.

2. As the conclusion of the China discussion turned out to be positive, what would the roadmap look like? At the end of that very meeting, there is a picture that records the event, which is somewhere in the RMI file. There was a clear consensus that any approach would require a Chinese partner of great influence and stature. The way to make that happen was to have the right American partners, so out of that important moment came the RMI, the Lawrence Berkeley National Lab, the Energy Foundation, the Asia Society, and a clear consensus that the right Chinese partner would be the Energy Institute under the Ministry of Energy. As is so often the case, very good ideas have trouble getting off the ground. An unsuspecting first day partner at RMI, namely Jon Creyts from McKinsey, was the Amory-chosen facilitator and soon the leader. Jon and I have mused often that an unsuspecting senior McKinsey partner would find that at the end of his first working day at RMI, he was in charge of China. While this can only happen in Amory's world as it so often does, the rest is truly an important piece of historical US-China relationship building.

Since the Reinventing Fire project, we have had many occasions to be together to work, to celebrate, and to look for the next project.

And that next project is well along, namely a microgrid to fuel the campus of the California College of the Arts in San Francisco. RMI has been an essential focal point for brainstorming on how to do this along with Stone Edge Farm, Heila Technologies, Jeanne Gang, and Atelier Ten. In several meetings, the net-zero RMI building in Basalt, another brainchild of Amory's, served as exhibit A and a benchmark for what might actually be accomplished. This project is a work in process with groundbreaking scheduled for May 2020.

BEYOND QUIRKY

Wes Jackson, Founder and President Emeritus, The Land Institute

David Brower was the founder of Friends of the Earth (FOE). Amory Lovins was associated with FOE. Both presented at The Land Institute's first Prairie Festival in 1978. It was hosted by Sam and Terry Evans at their farm/ranch north of Salina. The New Alchemy sponsored a small gathering to think about "The Village as a Solar Ecology." Amory and I were among them. Several times Amory and I met because both of us were associated with FOE and the Lindisfarne Fellowship. I have had a front row seat to watch the ascendency of Amory as a major eco-star of the time. All the above should establish my credentials.

Back in those days just mentioned, non-profits devoted to sustainable efforts seemed to be popping up like toast here and there. We all seemed to know one another and became acquainted with one another's mission. The Land Institute start-up was in 1976. New Alchemy was ahead of most of the rest, and Rocky Mountain Institute (RMI) shortly followed. Though many useful organizations faded, mostly due to lack of funding, RMI quickly grew in scale and in influence far beyond the rest of us. Why this was so was due in no small part to Amory's 1973 *Foreign Affairs* article and his otherwise brilliance. His rich insights about efficiencies in energy use flipped the discussion among environmentalists. The "limited energy" argument went more or less away. Instead, thanks to learning from Amory, we knew it was wrong to ask, "How are we to meet extrapolated and homogenous energy demands?" as Amory put it. He caused us to ask instead, "How can we meet heterogeneous end-use needs with an elegant frugality?" His phrase, "cutting butter with a chain saw," served as clarifying language to find the better "thermodynamic match." If all you want is butter for your toast, use a knife.

I cannot and need not list all of the contributions Amory's intellect has provided. I can say that he is a self-acknowledged "techno-twit" with a mind that ranges from knowing all the known knots of the world to how to build more efficient cars to a better way to light up or heat a place. The list is long.

Have I disagreed with Amory? For sure, but we have remained colleagues. For example, I believe we should put a cap on carbon at the mines, wellheads, ports of entry, and the forests, and then have rationing when it becomes necessary to ensure social justice. Were that to happen, then all of us could begin to address how good our technology can be. Amory has had more influence. Our approach for climate change is regarded as too negative.

I have told countless individuals and audiences that I have had the privilege of personally knowing three geniuses: One is the late geneticist, G. Ledyard Stebbins. Then there is the late shop teacher at Olathe High School I came to know when I taught there for two years in my first real professional job. The third is Amory. Here is my criterion for such a classification: It comes from my friend, Charlie Sing, human geneticist at the University of Michigan, who

is fond of saying that, "In the beginning, God created the normal distribution," the bell curve. The problem with that statement, when it comes to intelligence, is that it implies some kind of quantitative linearity, the IQ scale, for example. That might be fine as it applies to most people, but for the genius, it doesn't work, at least for me. The genius is qualitatively different, not quantitatively. The mind of Amory is so fundamentally different that there seems to be no place for him in the normal distribution. He is beyond quirky. Here is an example:

Back in the early '90s, Amory was here for a Prairie Festival. As now, we had interns, most still in college. In our house we sat on the floor as he tied several different knots around a table leg. It seems that he knows every kind of knot ever tied in the world. He advertised to the group by invitation something like, "If you're not tied up, come on over and get roped in." It was a great evening. A few weeks later *Time, Newsweek,* or some such announced that a new knot had been tied. I cut out the piece and sent it to Amory, who quickly responded in part that that knot had first been tied by such-and-such, I don't know, hundreds of years ago. I wrote back and said he should tell the magazine, "Knot Not New." I can't remember if he did, or not.

Now, does all of the above this just place him way off on the tail of the normal distribution? It would if that alone was all there was. He often goes beyond that to integrate the social, political, economic, and social justice dimensions in one fell swoop, which includes such products as his tropical forest home, sitting at over 7,000 feet in the Colorado Rockies, where he grows bananas, tropical fish, and other stuff. One would have to employ a whole bunch of normal distributions to capture his totality.

One more thing: Watch this techno-twit's creativity take off once we put that cap on carbon and have rationing. Right now he is limited, as we all are, because our material and energy limits are ignored. We're like greenhouse plants, unable to show our real stuff because we don't have to.

DEAR AMORY,

5 October 2019

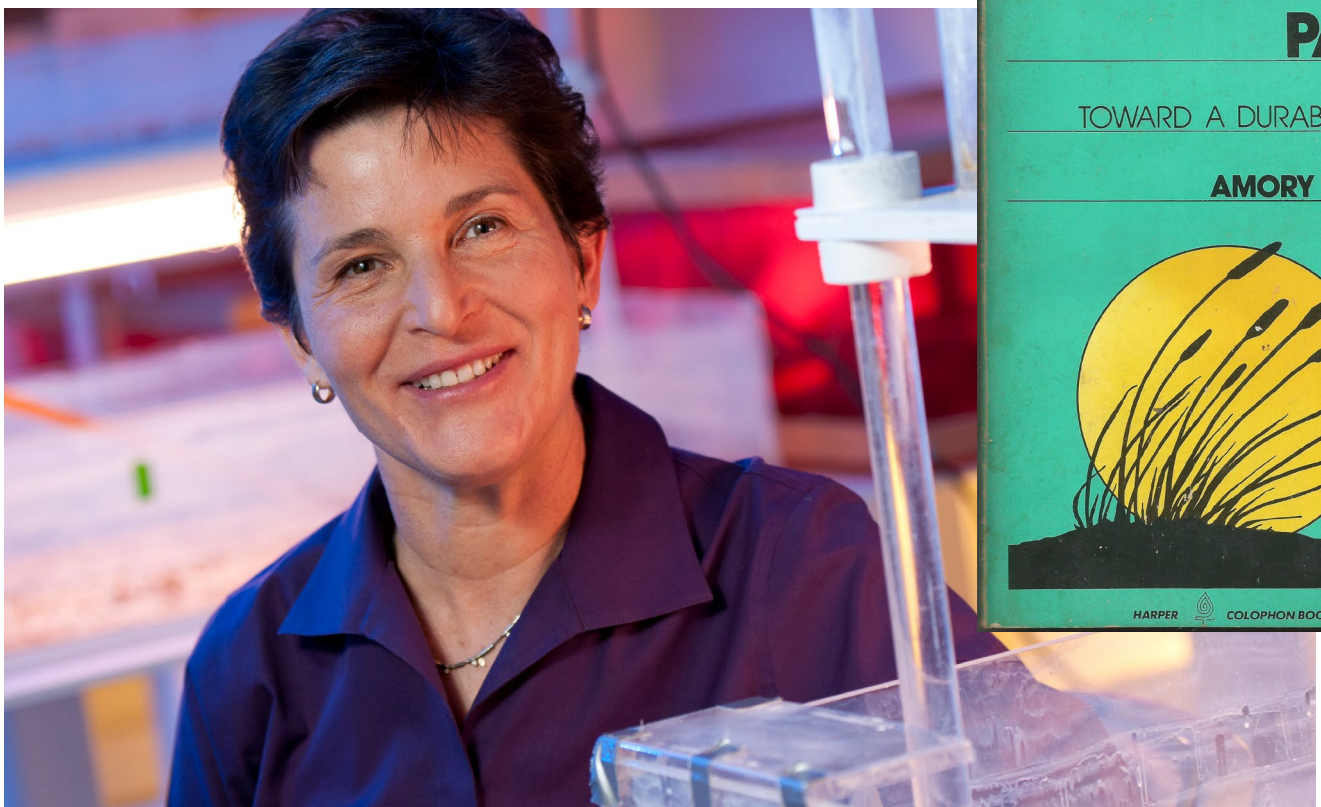
Mentors are like gold; they enrich our lives beyond our wildest dreams. Although we never worked directly together, I've long considered you my mentor.

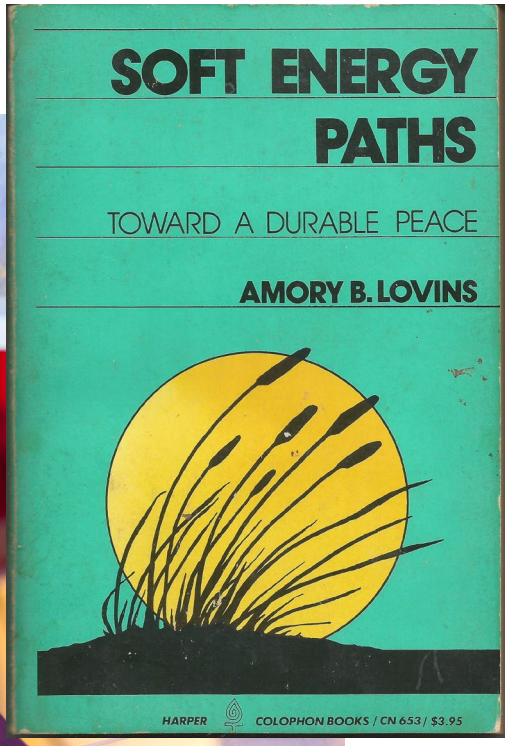
A brief timeline of my career follows—and you figure in prominently. Thank you for helping me forge that path, shining a bright light, and generously guiding us all along the way. You taught us well. We are now picking up the baton to guide the next generation of energy policy innovators.

A toast to your next chapter! I am eager to read your brilliant thoughts about the energy transition ahead. Please don't forget to help us squarely tackle our petroleum problems.

Sincerely,

Debbie Gordon
Sr. Fellow, Watson Institute for International and Public Affairs,
Brown University





1973–1976:
My passion for energy efficiency was ignited during the first oil crisis. With my high school driver's permit in hand, I spent most of my meager earnings as a checker at the local supermarket on gasoline and wasted a lot of valuable time in long lines at the pump.

1977–1982:
The oil rollercoaster ride continued in my college years. Studying chemical engineering at the University of Colorado, Boulder, I researched hydrogen in a catalysis laboratory. The second oil crisis cemented my energy policy passions. I'll never forget reading *Soft Energy Paths* by Amory, which illuminated my own path. Without having even (yet) met him, Amory served as my mentor.

In the months leading up to college graduation, I was offered cool, cutting-edge jobs working on renewable energy projects. Then, one by one, the phone calls came in winter 1982: every alternative energy job I had been offered was suddenly shuttered and fell into the valley of death.

1983–1987:
I'm a firm believer in making tasty lemonade out of lemons. The about-face in oil prices was as sour a lemon as they come for a rapid energy transition. Instead of pursuing our energy future, I took a job with Chevron in San Francisco as an environmental and regulatory engineer. In a back-to-the-future moment: one of my first projects in 1983 was to develop a fugitives protocol for non-methane emissions in the company's US production facilities. (I was instructed not to count methane since it didn't contribute to smog.) It was instructive viewing the energy world from the oil industry's perspective. But ultimately, it wasn't meaningful enough. Then one day a supervisor paid me a compliment for being a "good soldier." Alarm bells sounded, and I decided it was time to move on and apply to graduate school.

1988–1989:
Studying public policy at UC Berkeley was a perfect fit. I met my mentor—Art Rosenfeld—while working at the Lawrence Berkeley National Lab. We collaborated on the first vehicle feebate policy, and I worked with the California legislature to pass its first-ever feebate bill. I hung out with ERG students and forged a lifelong friendship with Jon Koomey (another one of Amory's fabulous mentees). This was an exciting time: I was now only one degree of separation from Amory!

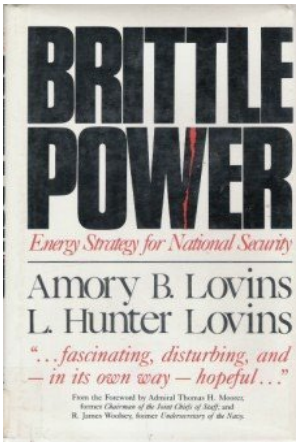
1990–1997:
Out of grad school I took a job as a transportation policy analyst with the Union of Concerned Scientists in D.C. and subsequently launched UCS' West Coast office in Berkeley. This is when I finally met Amory. We worked together in a broad coalition aimed at tightening federal fuel economy standards, advancing federal feebate legislation, and promoting energy innovations through the first-ever global warming bills in Congress. My world intersected with many friends of Amory's and Art's, including Lee Schipper, Marc Ross, Tim Wirth, Claudine Schneider, Michael Totten, Hal Harvey, Howard Geller, Jessica Mathews, Deborah Bleviss, Mark Levine, Alden Meyer, and more.

2018–2019:
I ran into Amory last year in D.C. What a warm welcome he gave me—as if no time had passed. His energy and ideas came rushing forth!

Fast forward to this moment. The research I conducted developing the Oil-Climate Index, while serving as the director of the Energy and Climate Program at the Carnegie Endowment for International Peace (2010–2018), is being incorporated into a project that I'm undertaking with gifted RMI staff. Working directly for the group Amory founded back in 1982, when I was just beginning my career, is an amazing arc in my career. Thank you Amory, for all you've done—and will continue to do!

A FESTSCHRIFT CONTRIBUTION FOR AMORY LOVINS

By Chris Lotspeich ("lot-speech")



I first discovered Amory through his work when I was a college freshman in 1984, and it was doubleplusgood. The article "Nuclear Power and Nuclear Bombs" and the book *Brittle Power* helped me realize that my interests in the environment, international security, and sustainable development intersected in the energy field. I was hooked, and I had a hero to hang on that hook.

For the next decade, I followed Amory's work from afar, taking notes in my car at lunchtime when he was on NPR, dreaming and scheming and biding my time. I imagined RMI was staffed by brainiacs in white lab coats inventing efficient light bulbs. I figured that I needed graduate degrees to work there, and I was lucky enough to attend the joint degree program at Yale's School of Management (SOM) and School of Forestry & Environmental Studies (F&ES).

Amory came to Yale for a conference during my first year there in 1994. I saw him walking alone in the hall and ambushed him, saying: "Excuse me Mr. Lovins, you don't know me, but your work has shaped my career and changed my life, and I just wanted to thank you." "Well, come talk to me," he replied, and I spent the rest of the conference at his side and drove him to the airport. (Thank you, Teresa Heinz [Kerry] for funding the conference!)

SOM had an internship fund that sponsored students to work in nonprofits, and I leveraged that to finagle a summer in Old Snowmass. Fortunately, Amory decided that I was a keeper. From then on, I worked part time in school and full time summers and holidays, tailoring my studies to RMI projects. My schoolmates tell me now that they viewed me then as an inspiring example, "cavorting with celebrities" on Mount Ecolympus. I felt the same way. I drove out to Colorado to stay after graduating in 1996.

I had the honor and pleasure of being Amory's executive assistant, and perhaps the distinction of being his longest-serving exec at seven years (although later lads might have exceeded my tenure). It was my dream job, the best gig in the world. It is a rare blessing in life to even have a

hero, never mind end up his apprentice. Amory has been a terrific mentor, a great friend, and a courageous leader by example. He is the hardest working man in show business, the James Brown of the environmental movement. When I heard he was "stepping back," I ribbed him: "That means what, 40-hour workweeks?" Props to Judy for getting him to go on vacations beyond his annual long weekend at Esalen!

The responsibilities of my era included humping bags over hill and dale across six continents that were crammed with reams of paper and stuffed with stacks of overhead projector transparencies (remember those?!). Digital era lightweights have it easy. My back cracks in flashbacks when I jam luggage into taxi trunks or airliner overhead bins. I think I broke toes on passers-by and might have caused a hit-and-run fatality dashing through Bangkok Airport, baggage train in tow, tipping onto one wheel around corners, sweating and straining to keep up with Amory. No wonder he favors scholar-athlete acolytes. William McDonough observed that humans are not so smart; it took us five thousand years to put wheels on luggage. I often felt like a fifth wheel traveling with Amory; he was so good at it after years of lone-wolf globetrotting that he hardly needed a Sherpa sidekick.

Amory's most potent ideas are awe-inspiring in their simplicity and common sensibility. He distills complex cocktails of technical and economic insight into accessible draughts of wisdom and humor with the dispensation of a genial bartender, leaving global audiences chuckling as they chug inspiration from his intellectual fire hose. Amory credits his mentor David Brower with the imperative that every third thing you have to say should be a joke. (Brower recruited Amory to Friends of the Earth during his Oxford days, a mitzvah for humanity on par with cofounding the Sierra Club.)

Perhaps the most influential of Amory's offerings is his focus on end-use applications and the services people seek from the resources they consume—hot showers and cold beer rather than electrons and sticky black goo, in his memorable phrasing. He asked: What do people really want, and what is the cheapest, cleanest way to deliver it? Usually there is a better way by using more smarts and less stuff, and he masterfully spins engaging tales of real-world examples in almost every sphere of human endeavor. Amory flipped society's ontological supply-side bias on its head to focus on the demand side, to great effect. This upstream view evokes social psychologist Kurt Lewin's axiom that "there is nothing so practical as a good theory."

His friend and colleague Ernst Ulrich von Weizsäcker once introduced Amory to a Stuttgart audience by saying he'd be remembered among the likes of da Vinci, Galileo, and Einstein. To my eye Amory's cheeks reddened slightly, a first. I don't know if Lovins will ever become a household name, but his lasting impact will be felt behind the scenes of every transformed industry if humanity pulls off the transition to a sustainable society. Kleos!

I was glad to have an MBA, for it enabled me to appreciate, participate in—and even simply comprehend—Amory's work. My business school training allowed me to understand the compelling and innovative methodologies for valuing distributed energy resources in *Small Is Profitable*, which I worked on a bit. I can attest that to this day I encounter folks in the energy industry who continue to lean on those tools and techniques from their dog-eared copies.

Amory's brilliance at making the business case for his recommendations is a huge part of his influence, effectiveness, and transformation from heretic to respected champion of

sustainable commerce sought after by industries worldwide including global leaders in energy, manufacturing, transportation, and finance. *Natural Capitalism* remains a powerful compendium of practical solutions and proven best practices. I'm honored to have had my F&ES master's project form the basis for the fibers chapter of "Nat Cap," and fortunate to have been among the three founding consultants in RMI's corporate consulting practice.

Working with Amory and his "green mafia" inner valence of world-class expert pals to improve the resource productivity of dozens of manufacturing facilities worldwide had a decisive impact on my career. It taught me enough about integrative whole-systems design to make me a P.E.—Pretend Engineer. Ever since leaving RMI in 2001, I've lived off that network and knowledge in the workplace. Even now I am the only non-engineer on my employer's consulting team.

Amory always understood the national security implications of his "soft path" approach. He has long talked the talk and walked the halls of senior military leadership, where his perspective commands respect. In my experience, this is a rare trait among progressives, and it was a major attractor to me as a young international politics major. His seminal work on energy network resilience, *Brittle Power*, was funded by the Department of Defense (DoD). This prescient 1982 book remains relevant today and was re-released in the wake of the September 11, 2001 attacks.

Global citizen Amory has served his country on the Defense Science Board and other work with DoD. The US Navy and Marine Corps in particular have paid close attention, engaging Amory's and RMI's counsel on energy security and resilience; operational energy and water efficiency at sea, on land and in the air; green building; and other topics of strategic import. Of all my undertakings with RMI, I'm proudest of my involvement in this work, and I'd like to think Amory lent fair winds and following seas to the Navy's leadership among the services in this arena.

Watching Amory's mind work from up close was fascinating. Even after many years at his side, just when I thought I'd heard it all, he'd distinguish discrete mycelia in detail or describe the differences in the molecular structure and properties of dark chocolate vs. milk chocolate (it depends on how you cook it). He seems to have a fifty-server farm in his forebrain, each one containing Ph.D.-level knowledge in a different discipline, and he leaps nimbly and instantaneously between them as needed. Yet if a new employee fresh out of college suggests an edit to a document Amory is typing, he immediately enters it. He respects the intelligence of others and the value of their contributions. His writings and talks are full of references and citations of other people's ideas; he has always shared credit where credit is due. Ego is no barrier.

It's a good thing Amory is one of the good guys, because we'd be in deep trouble if he went over to the Dark Side and became a James Bond super villain. (Although he does have the requisite cool high-tech lair tucked into the side of a mountain.) It is also fortuitous that he lacks the enzyme necessary to break down alcohol, for the fate of industrial civilization rests in part on his sobriety.

If Amory has a brain the size of a planet, he has a heart the size of a galaxy. Who has more love in their name alone? "Amore Love-ins," a double shot of the good stuff. Love is the inexhaustible renewable resource of this Energizer Bunny—or orangutan. Applied Love is his favorite flavor, and boy does he let his little light shine. Keep bringing the love, Amory, the world needs it now more than ever. As he likes to quote: "Spread the gospel every day; if necessary, use words."

Ram Dass called Amory “a spiritual mensch.” Though he’s more of a Taoist, Amory embodies true Buddha nature: compassion, clarity, humility, service to others, light-hearted humor, and impressive equanimity. In all the thousands of hours I’ve spent with Amory, even after grueling travel and stressful situations, I’ve never heard him raise his voice and the strongest epithet he utters is a muted “oh, shit.” His humanity, dignity, and disarming discourse deflate ardent critics and impassioned ideologues, deftly redirecting attackers into dance partners with the grace and surprise of an Aikido master.

Even his constructive criticism feels like helpful suggestions rather than anger, disappointment, or humiliation. He was always patient and forgiving with me, even when I didn’t deserve it. My apologies again for that episode at Hong Kong Airport, Amory! I had too much free-flowing first class sake on the redeye en route… not my finest hour.

Amory suspects he’s a born-again Bornean, close cousin to his Pongoid long-armed orange friends in the Indonesian rainforest. In Buddhism, a bodhisattva is a liberated soul who turns back before the gates of Nirvana to live a life of service amongst the masses, helping others achieve enlightenment as well. I consider Amory to be a Pongosattva. The orangutans have sent us their best warrior incarnate in human form, to help save us all from ourselves and preserve our shared habitat, this island Earth.

Amory made me a techno-optimist. Indeed, he has demonstrated or chronicled that the solutions to our ecological existential crisis have already been implemented successfully somewhere, if not at scale. As he puts it, “that which exists is possible.” If my faith in humanity’s ability to change course wavers, I’m more concerned about political will and the pace of societal mobilization, less about science and technology. Amory has shown that the race between the rabbit of our self-destructive behavior and the hare of our enlightened evolution is ours to lose. He’s written the manuals. Will we follow their instructions in time?

So I raise a glass of still water (hold the ice) and a nice, ripe durian to toast Amory, mon vieux. Thank you for your tireless service, generosity, creativity, friendship, leadership, and plain old hard work on all our behalf. If we manage to pull out of our flat spin and avoid crashing the biosphere, you deserve an outsized share of the credit. Long may you wave! I look forward to celebrating our success at your centenary.

Very respectfully, **Chris Lotspeich**


Manoj
Singh
Amory
Lovins

DEAR AMORY,

Tom Dinwoodie, 10.19.2019

I recall a day in the fall of 1974, when I saw notice of a lecture by Amory Lovins at Cornell's Willard Straight Hall. Having read something by you already concerning "soft energy paths," and knowing that I was somehow destined myself to engage with the topic of energy, it was important for me to attend your lecture, which I did. As it was so long ago, I only recall fragments: the room was packed and this man spoke with remarkable clarity and deep knowledge, and with the most intriguing insights on how the world was bumbling its way through energy and what were the more intelligent paths. A unique and true independent thinker. As you exited the room through the central aisle formed by the rows of chairs on either side, I recall my impulse was to reach over and make contact, for whatever reason: Reality check? Hero figure? Touching divinity? You had made a giant impression.

I had known since studying the greenhouse effect of the planet Venus in the eighth grade that there needed to be another way to develop energy on this planet. As a freshman that year at Cornell's engineering school, I was struggling to find my path. My focus quickly became how to develop other sources, clean and renewable, comforted by the thought that greater minds were tackling the biggest questions.

Fast forward to my first RMI board meeting (2011?), invited by Sue Woolsey to be an observer, in which RMI was pondering its next moves. It appeared the world was on its way to the RMI preachings, as evidenced by industry making megabucks with energy efficiency and other indicators. So what was left for RMI to do? Many thoughts were tossed around—all the way to a broader focus on Gross National Happiness—yet it quickly became clear that RMI should stick to its knitting and see this revolution to its end. The imperative of climate simply demanded it.

I am astounded when I consider what you and RMI have accomplished since that juncture. With *Reinventing Fire*, you have written the definitive analysis of the logic, timing, and economic value of the US energy transition, pointing the way to the tremendous opportunity faced by OECD nations. Your global stature would later open the door for a comparable analysis with China, pointing the way for all non-OECD nations. I would offer that without your opening China's door, that nation would not have seen its way to

a bilateral agreement with the US, which, as we know now, bolstered every nation on the planet to follow suit and sign the Paris Accords (ponder that as legacy!). And that same global stature would later open doors in India to help that nation leapfrog oil altogether. All while your mentees (aka MDs) invented such accelerator structures as the BRC, eLab, and Energy Web Foundation. And organizationally, you have had the wisdom and personal strength to "let go" to the brilliant and productive flock that has followed you down this path, which has given rise to no end of new ideas and momentum, and an institution that will long outlive you in inspiring this world toward sustainable ways.

I have heard it said that we have lost the past three decades to inaction on climate. Yet nothing could be further from the truth. The components of the new energy paradigm have marched steadily along their S-curves to the point of "new norm," and in prime position for the steep slope of continued exponential growth, the phase where true disruption occurs. If humanity solves climate, it will owe a great debt to you, Amory, for laying the vision and groundwork for the solution set. That is a debt that cannot be measured.

If there were ever a Change Agent, it is you, Amory, and perfect for the job—operating Aikido style both within the military and within powerful industries that are loathe to change, confronting the arrogance of the entrenched with the unemotional logic of facts, figures, and opportunity.

Bravo, Amory. You have accomplished what other brilliant people could at best strive for. A legacy not only of ideas, but a way of thinking. Inspired, lasting, and meaningful impact. And considering the fuller breadth of your character (poetry, piano, photography, banana farming, Buddhist/Taoist philosophies . . .)—A Whole Systems Life.

Monumental.

Cheers to you, Amory. And from the depth of my heart, THANK YOU for your inspiration!

Tom Dinwoodie

F E S T S C H R I F T

for Amory Lovins